FILE NO.

SANYO

SERVICE MANUAL

Video Cassette Recorder

(VHR-258EV, VHR-258EV+, VHR-268SP, VHR-278SP) VHS PAL

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CIRCUIT DIAGRAMS (Refer to the separate volume)

VHR-248EX
(Product Code : 143 173 16)

VHR-258EV
(Product Code : 143 173 19)
(Europe)

VHR-258EV+
(Product Code : 143 173 55)
(Portugal)

VHR-278EX
(Product Code : 143 173 18)
(Europe)

VHR-278G
(Product Code : 143 173 25)
(Germany)

VHR-268SP
(Product Code : 143 173 07)

VHR-278SP
(Product Code : 143 173 08)
(Spain)

Please see other materials with Reference number given in table below.

Materials	Model No.	Reference No.
Mechanism Manual	V95 I Mechanism	MM531433
	V95 II Mechanism	MS531500

PRODUCT SAFETY NOTICE

The components designated by a symbol (⚠) in this schematic diagram designates components whose value are of special significance to product safety. Should any component designated by a symbol need to be replaced, use only the part designated in the parts List. Do not deviate from the resistance, wattage, and voltage ratings shown.

NOTE: 1. Parts order must contain model number, part number, and description.
2. Substitute parts may be supplied as the service parts.
3. N.S.P. : Not available as service parts.

Design and specifications are subject to change without notice.

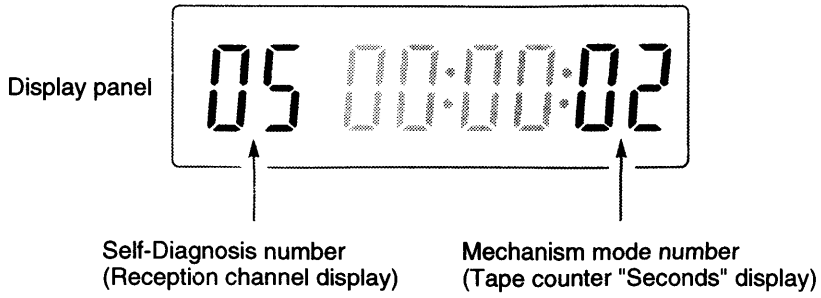
SELF-DIAGNOSIS DISPLAY

Mechanism Mode Display / Head Output Drop Warning Display / Cylinder Rotation Accumulated Time Display

This unit displays the diagnosis contents of abnormalities and the mechanism, mode on its display panel in 2-digit numbers.
When the head playback output has dropped, the "L" sign will be blinked. Some models (listed later) will also display the cylinder rotation accumulated time.
These display shows the outline of the problems. Use it as a reference when servicing the unit.

1. Self-Diagnosis Contentes and Mechanism Mode Display

- When the STOP button on the remote control is pressed for about 10 seconds continuously, the self-diagnosis number will be displayed on the reception channel display of the display panel and number indicating the failed mechanism mode (changed mode when being shifted) on the tape counter "seconds" display for 10 seconds each.
- During self-diagnosis display, displays other than the diagnosis number/mechanism mode number and the cylinder accumulated rotation time display described later (some models only) will be turned off and when displays end, the normal display will be returned automatically.
- Refer to "Self-Diagnosis Contents" for the self-diagnosis numbers and the "Mechanism Mode Display Contents" for the mechanism mode numbers.
- When the "0" button on the remote control unit is pressed during display, and clearing the self-diagnosis display and mechanism mode display.



Self-Diagnosis Contents

No.	Problem	Main Possible Cause	Mechanism Operations and State After Occurrence
00	There is no abnormality in the mechanism.		
01	The cylinder motor does not rotate.	• The cylinder motor is faulty. • The control of the cylinder motor is faulty. • The tape winds around the cylinder.	Shifts to the STOP mode.
02	The take-up reel does not rotate.	• The take-up reel is caught. • The reel belt is faulty. • The take-up torque has decreased.	Shifts to the STOP mode.
03	The capstan motor does not rotate.	• The capstan motor is faulty. • The control of the capstan motor is faulty.	Shifts to the STOP mode.
04	The tape cannot be loaded with the cassette inserted. (But unloading can be performed.)	• Error in the operations of the tape loading mechanism. • Foreign particles in the tape loading mechanism. • The tape end sensor is faulty. • The reel brake of the tape cassette has not been released.	Unloads, shifts to the INITIAL mode, and the power goes off.
05	Tape loading and unloading cannot be performed with the cassette inserted.	• The tape guide is caught. • The loading motor is faulty. • The control of the loading motor is faulty.	The power is forcibly turned off with the mechanism at its current position.

No.	Problem	Main Possible Cause	Mechanism Operations and State After Occurrence
06	Front unloading cannot be performed when ejecting the cassette. (Front loading can be performed.)	• The cassette drive mechanism is faulty. • The front door is caught.	Front loads and shifts to the STOP or INITIAL mode. • When the power switch is turned on before eject operations: Shifts to the STOP mode. • When the power switch is turned off before eject operations: Shifts to the INITIAL mode and the power goes off.
07	Front loading and front unloading cannot be performed when ejecting the cassette.	• The tape cassette is caught in the cassette drive mechanism. • The main cam and front rack gear of the front loading mechanism have not engaged properly. • The gears of the front loading drive mechanism have not engaged properly.	The power is forcibly turned off with the mechanism at its current position.
08	The mechanism becomes 1 (REVIEW) while moving from 2 (IDLER), 3 (STILL), 4 (BRAKE), and to 5 (STOP).	• The mechanism mode switch contact is faulty.	The power is forcibly turned off with the mechanism at its current position.
09	The mechanism becomes 7 (INITIAL) while moving from 1 (REVIEW), 2 (IDLER), 3 (STILL), 4 (BRAKE), and to 5 (STOP).	• The mechanism mode switch contact is faulty.	Carries out tape take-up operations, shifts to the INITIAL mode, and the power goes off.
10	The capstan motor does not rotate and cassette tape eject when cassette tape insert.	• The capstan motor is faulty. • The control of the capstan motor is faulty.	Shifts to the STANDBY mode. Protect cassette tape.
11	The cylinder motor does not rotate and cassette tape eject when cassette tape insert.	• The cylinder motor is faulty. • The control of the cylinder motor is faulty.	Shifts to the STANDBY mode. Protect cassette tape.

Note: For details of mechanism operations corresponding to the mechanism positions of the self-diagnosis numbers 08 and 09 above, refer to the separate volume on the V95 I mechanism manual. These manual reference numbers are shown in the cover.

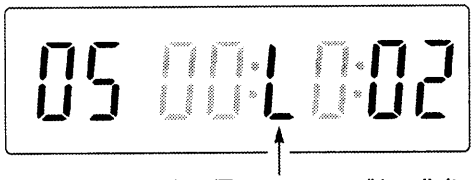
Mechanism Mode Display Contents

Mode No.	Mechanism Mode	Mode No.	Mechanism Mode	Mode No.	Mechanism Mode
00	CASSETTE OUT	07	SLOW	14	FAST FORWARD
01	STANDBY	08	PLAY	15	REWIND
02	STOP	09	REC	16	VIDEO INSERT
03	STILL	10	AUDIO DUBBING	17	VIDEO INSERT-PAUSE
04	REC-PAUSE	11	X2 SPEED PLAY	18	AUDIO/VIDEO INSERT
05	AUDIO DUBBING-PAUSE	12	CUE	19	REVERSE X2 SPEED PLAY
06	FRAME ADVANCE	13	REVIEW	99	OTHERS

2. Head Output Drop Warning Display

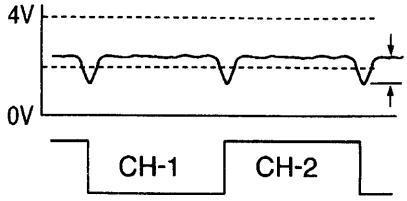
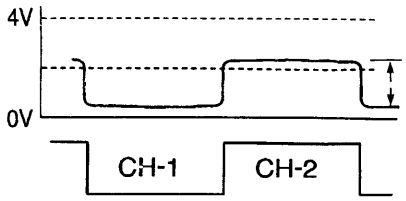
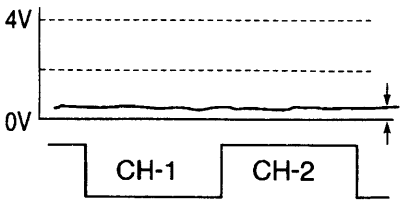
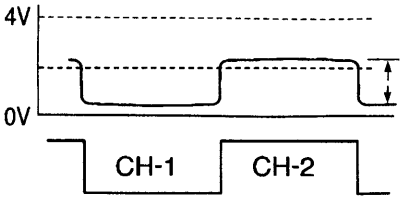
- When the STOP button on the remote control is pressed for 10 seconds continuously 10 seconds after play starts, "L" will be displayed blinking at the first digit of the minutes position on the tape counter when the head output is lower than the specified value to indicate an abnormality.
- The cause of the abnormality may be due to drop in the playback output caused by drop in the efficiency of the cassette used or head clogging. Refer to "Head Playback Output Voltage Check" as a means to judge the abnormality.

Display panel



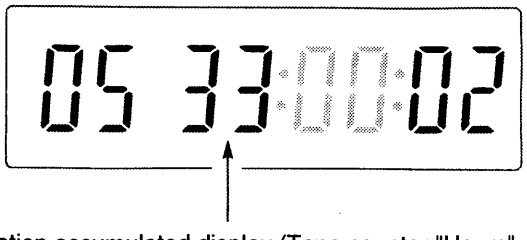
Head output drop warning display (Tape counter "1st digit of Minutes." position)

Head playback output voltage check

Cassette Used	Warning Display	Envelope Detection Output Voltage	Main Cause
Cassette with normal playback output	–	Envelope detection output (IC301 Pin 25 or R3032 Mark side: see Fig. 2-1-1) Switching pulse (TP183: see Fig. 2-1-2) 	When the output voltage difference of the two channels is 0.5 to 0.95V • The video heads of both are normal
Recorded cassette (with tabs)	"L" blinking	Envelope detection output (IC301 Pin 25 or R3032 Mark side: see Fig. 2-1-1) Switching pulse (TP183: see Fig. 2-1-2) 	When the output voltage difference of the two channels is more than 0.95V • Tracking adjustment has not been performed accurately • One video head is clogged • One video head has worn out
	"L" blinking	Envelope detection output (IC301 Pin 25 or R3032 Mark side: see Fig. 2-1-1) Switching pulse (TP183: see Fig. 2-1-2) 	When the average output voltage of the two channels is less than 0.5V • Tracking adjustment has not been performed accurately • Both video heads are clogged • Both video heads have worn out
Rental cassette (without tabs)	"L" blinking	Envelope detection output (IC301 Pin 25 or R3032 Mark side: see Fig. 2-1-1) Switching pulse (TP183: see Fig. 2-1-2) 	When the output voltage difference of the two channels is more than 0.95V • Tracking adjustment has not been performed accurately • One video head is clogged • One video head has worn out
	• Some rental cassettes may have extremely low video playback outputs even when both video heads are normal. As the average output voltage of the two heads may be less than 0.5V for some, no warning displays will be shown.		

3. Cylinder rotation accumulated time display

- Press the STOP button on the remote control for approximately 10 seconds and the cylinder rotation accumulated time excluding the cassette out and standby operation time will be displayed on the "Hours" display in units of 100 hours. ("33" will be displayed for 10 seconds for 3,200 to 3,299 hours.)
- To erase the cylinder rotation accumulated time display, press the RESET button on the remote control during the accumulated time display.

Display panel 

Cylinder rotation accumulated display (Tape counter "Hours" display)

1. DISASSEMBLY

1-1. REMOVAL OF CABINET, MECHANISM UNIT, AND MAIN BOARD

REMOVING THE CABINET PARTS (Fig. 1-1-1)

1. Remove the cabinet and bottom cover by removing the four screws ① and four screws ②.
2. Remove the front panel by removing the locks of the clamps (A) using a screwdriver, etc. and slightly rotating the bottom part in the direction of the arrow.

Notes: • Electrical adjustments for the this model can be performed with only the cabinet removed.
• When replacing the bottom cover, do not tighten the screws ② too much. Excess tightness may damage the screws taps on the chassis.

REMOVING THE MECHANISM MAIN UNIT AND THE CP-1 PWB ASSEMBLY (Fig. 1-1-2 and 1-1-3)

After removing the cabinet parts, remove the mechanism unit and the CP-1 PWB assembly connected as follows.

1. Spread out the lock clamps (C) in the arrow direction slightly and remove the TM-1 PWB as shown in Fig. 1-1-2.
2. Remove the screw ④ at the chassis.
3. Remove the screw ⑤ in the chassis, the screw ⑥, and the holder in this order.
4. Remove the two screws ⑦ and two screws ⑧ of the mechanism unit. The two screws ⑧ of the cassette tray can be removed easily by pushing the tray lock lever in the arrow direction to remove the lock as shown in the enlarge view A and by pushing the lid opener lever in the arrow direction to remove the lock as shown in the enlarge view B.
5. Lift up the whole mechanism unit and main board (CP-1 PWB assembly), and as shown in Fig. 1-1-3, push the two lock clamps (D) of the chassis in the arrow direction so that they can be removed from the chassis.

M-AP2L/E-1

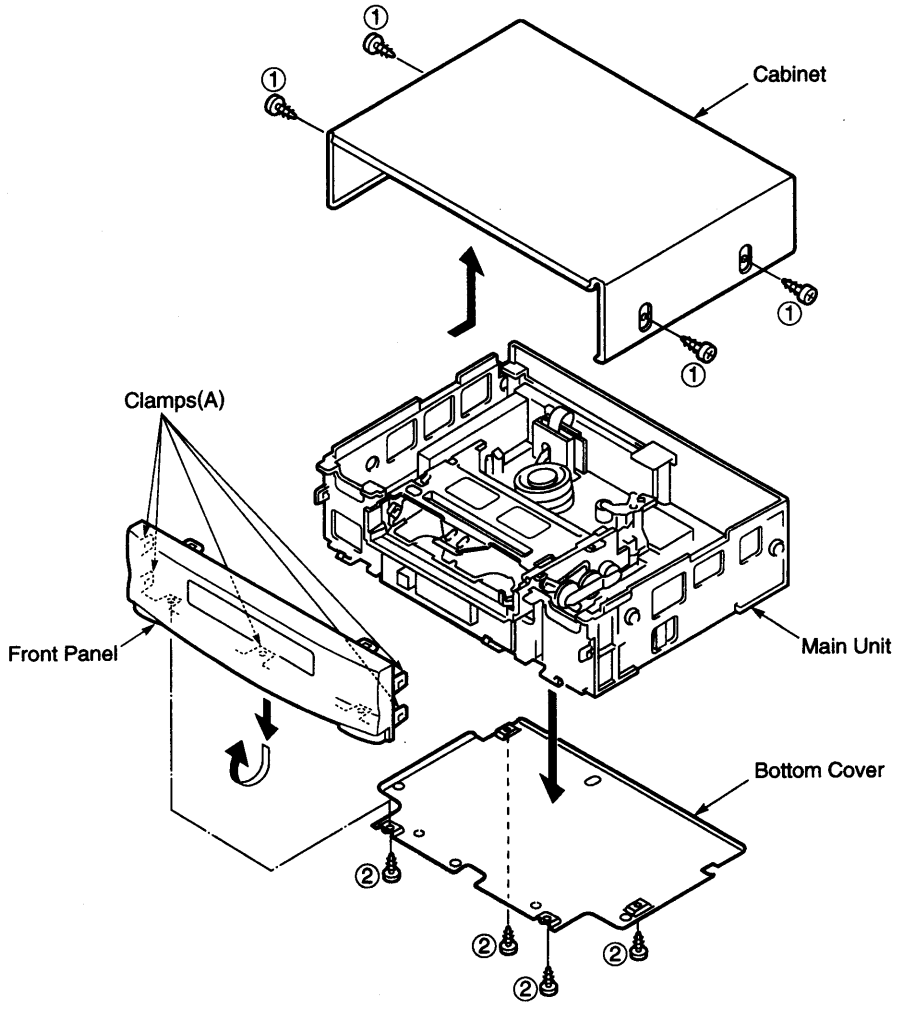


Fig. 1-1-1

M-PF2LN/TA-2

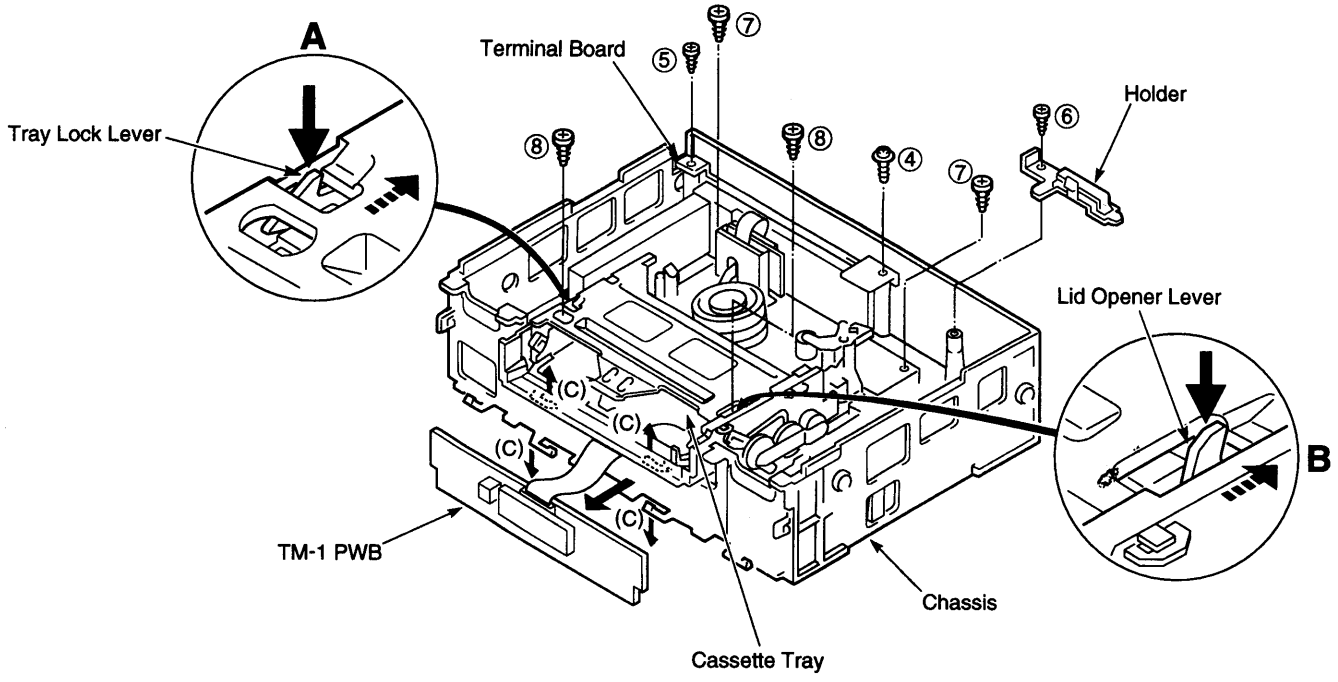


Fig. 1-1-2

M-PF2LN/TA-3

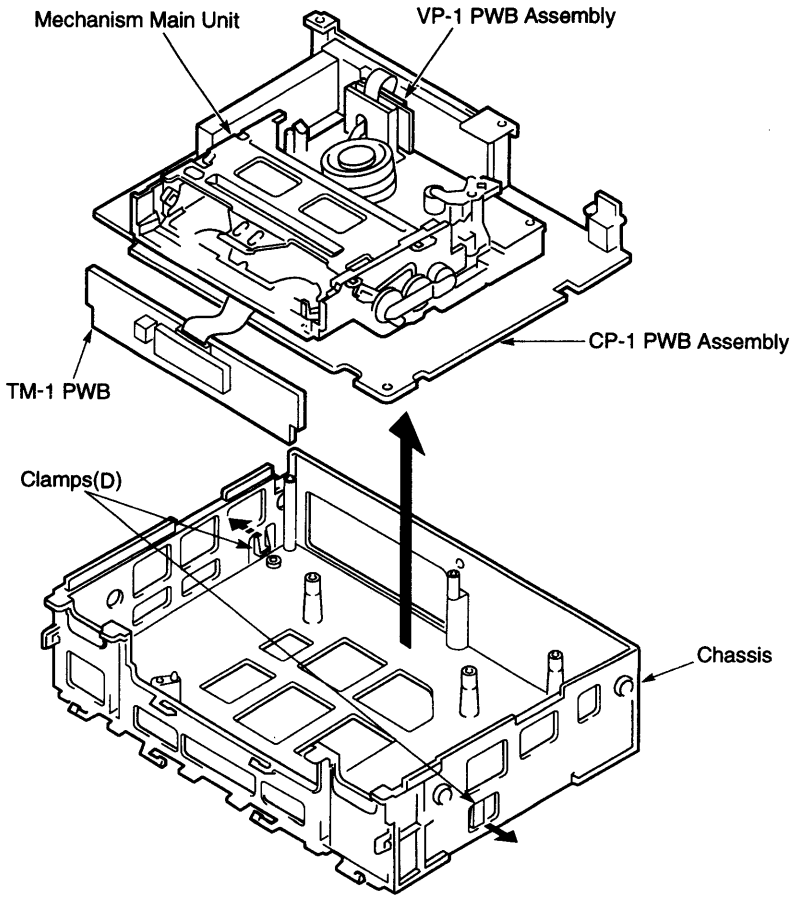


Fig. 1-1-3

1-2. TEMPORARILY SETTING UP AND CONNECTING CP-1 PWB ASSEMBLY

The following is an example of how to place and connect the main board without a jig, when repairing the CP-1 PWB assembly.

1. Place the mechanism unit and main board up side down as a whole on a flat surface with foil side of the main board facing up.
2. Operete the unit using the buttons on TM-1 PWB or the remote control.

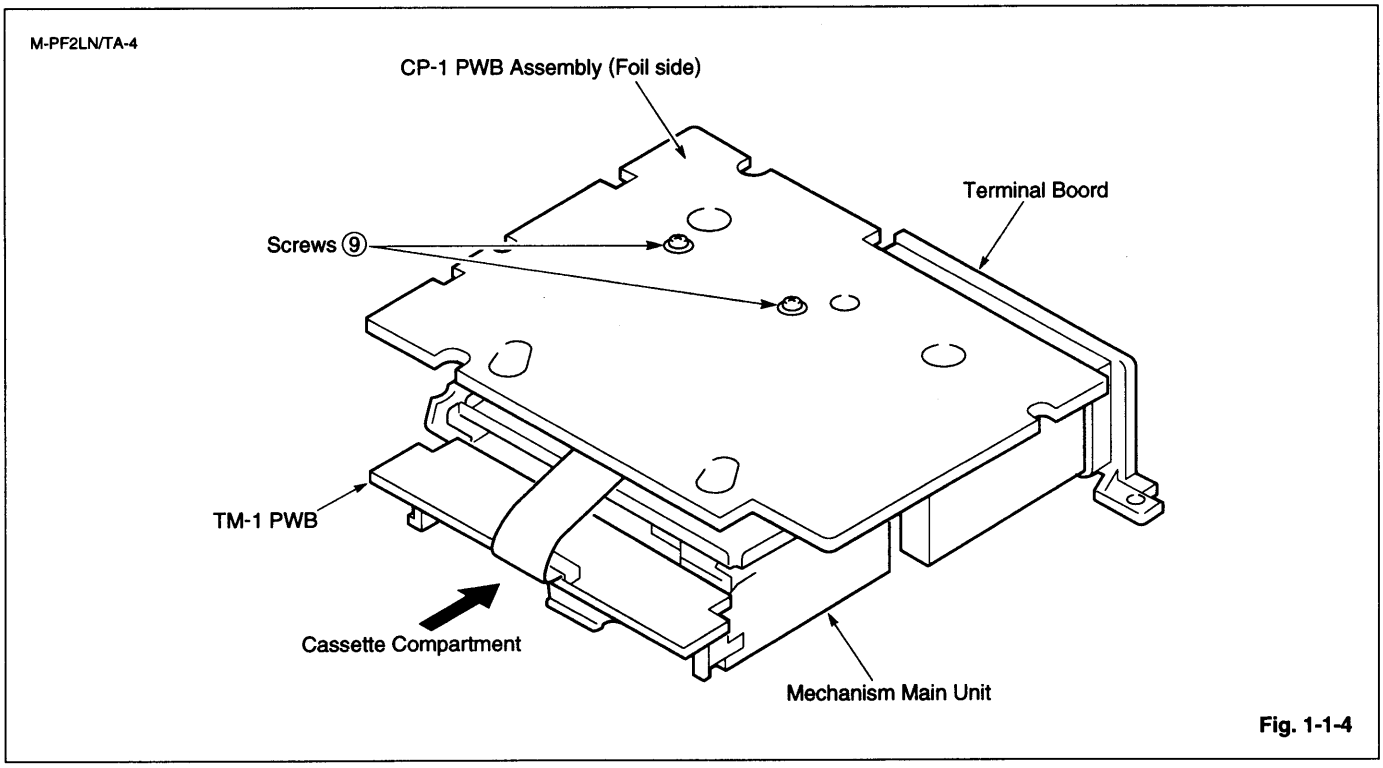


Fig. 1-1-4

1-3. INSTALLATION OF THE FRONT PANEL

When installing the front panel to the chassis after repaires and adjustments.

1. Pressing down the door opener lever of the mechanism main unit.
2. Set the cassette door to half-opened state as shown in Fig. 1-1-5, and install the front panel to the chassis.

Note: Opened cassette door position does not install the front panel to the chassis.

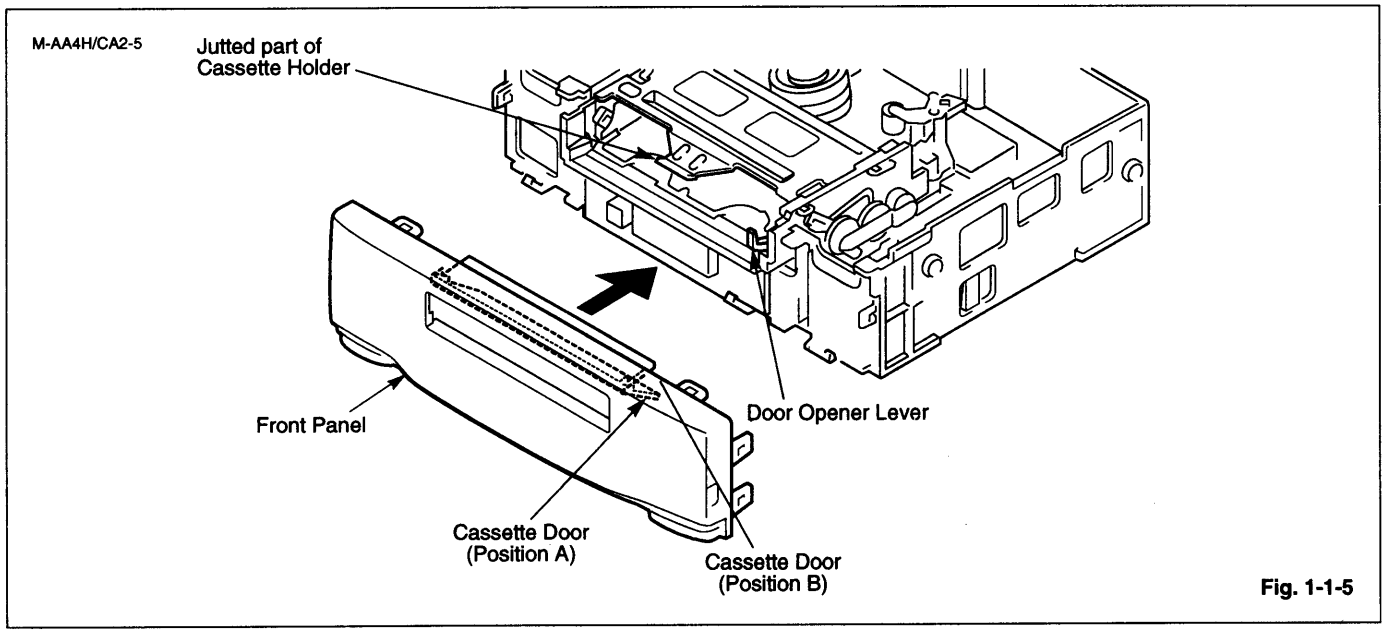
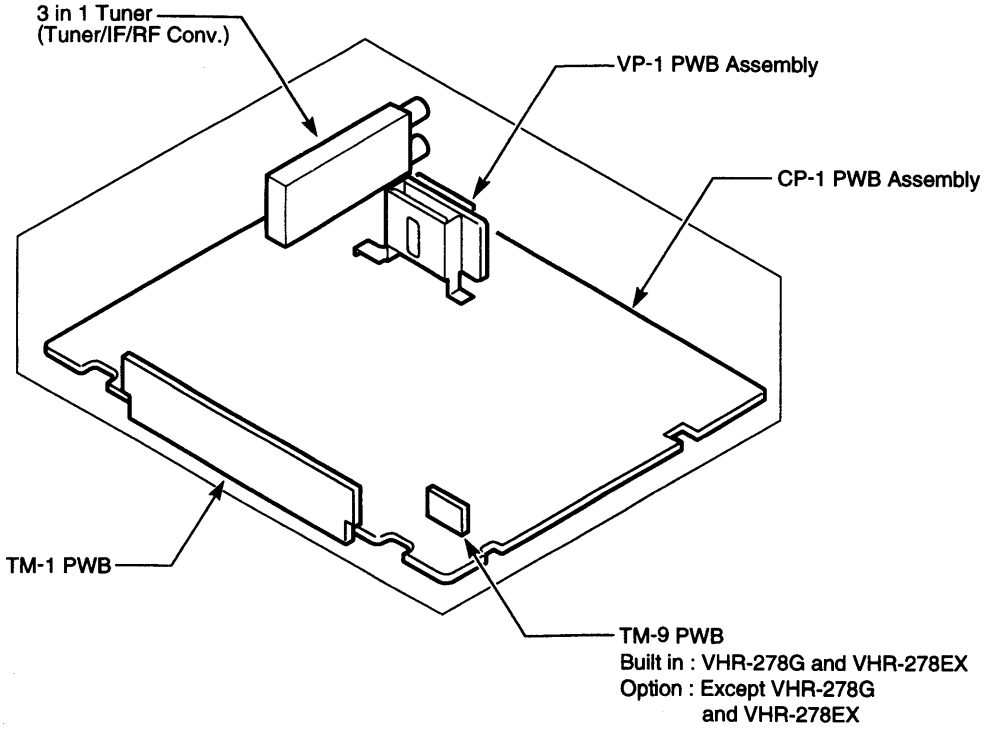


Fig. 1-1-5

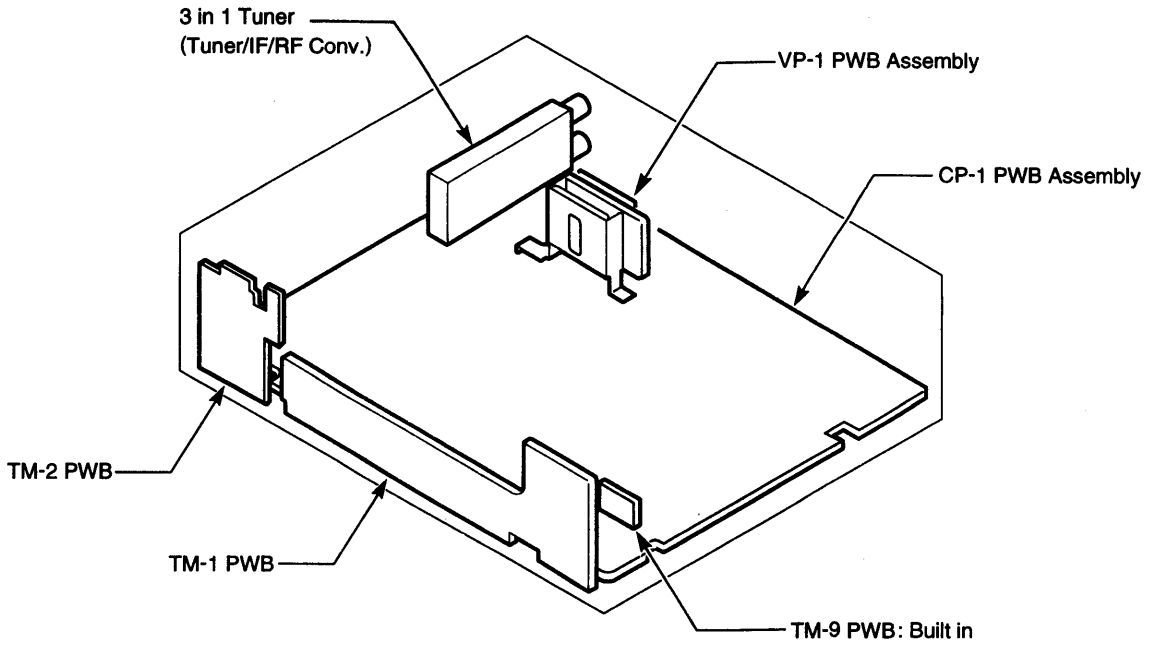
1-4. CIRCUIT BOARD LOCATIONS

L-AP2L/E, AP2/EX

VHR-248EX
VHR-258EV
VHR-258EV+
VHR-278G
VHR-268SP
VHR-278SP



VHR-278EX



2. ELECTRICAL ADJUSTMENT

VCR PRESETTING

This VCR need three basic presetting by using the menus displayed on-screen. After all connection have been made, then follow steps 1 to 3 to preset the VCR.
The three presetting steps will be displayed in sequence on TV screen. The setting are entered with the remote control.

Turn on the VCR

1. Adjusting the TV receiver to the video channel: The AUTO SETUP screen will appear. When the video channel has been preset, press the OK button on the remote control.
2. Country selection: Using the numeric button, select the country of use.
3. Language selection: When the desired language has been select, press the MENU/TV button directly before prevent auto tuning will start.

When steps 1 to 3 have been finish, ready to operate the all operating mode.

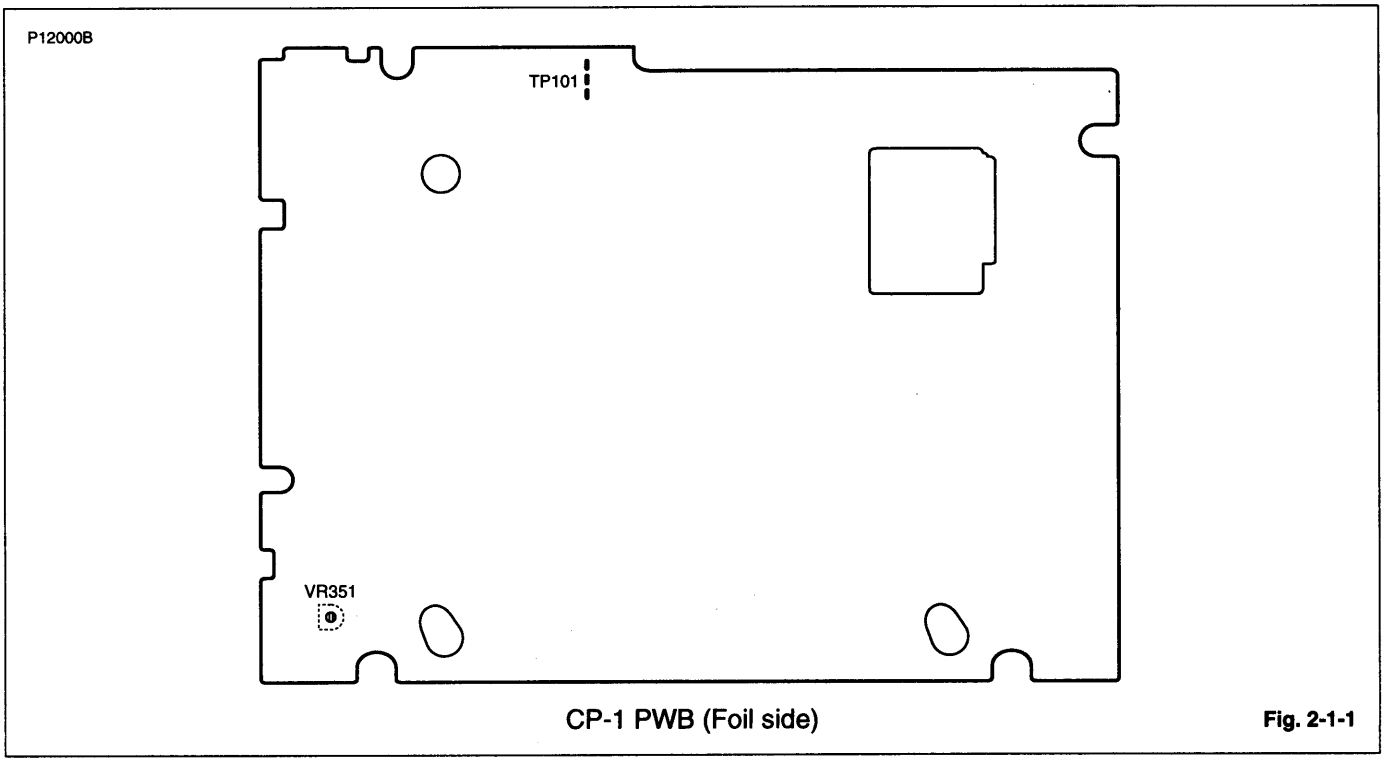
2-1. SERVO CIRCUIT ADJUSTMENT

- These adjustments should be done upon completion of the tape transport adjustments.
- If the tape transport adjustments (except the tilt adjustment) are done after these adjustments, follow the procedures again in section 2-1-3, "Switching position adj."
- When a cassette tape is loaded, auto-tracking will be set immediately after starting the first playback. As this will daviate the tracking center set, be sure to press the channel buttons (+) and (—) once directly after starting playback to prevent auto-tracking from being set.

2-1-1. TEST EQUIPMENT AND STANDARDS REQUIRED

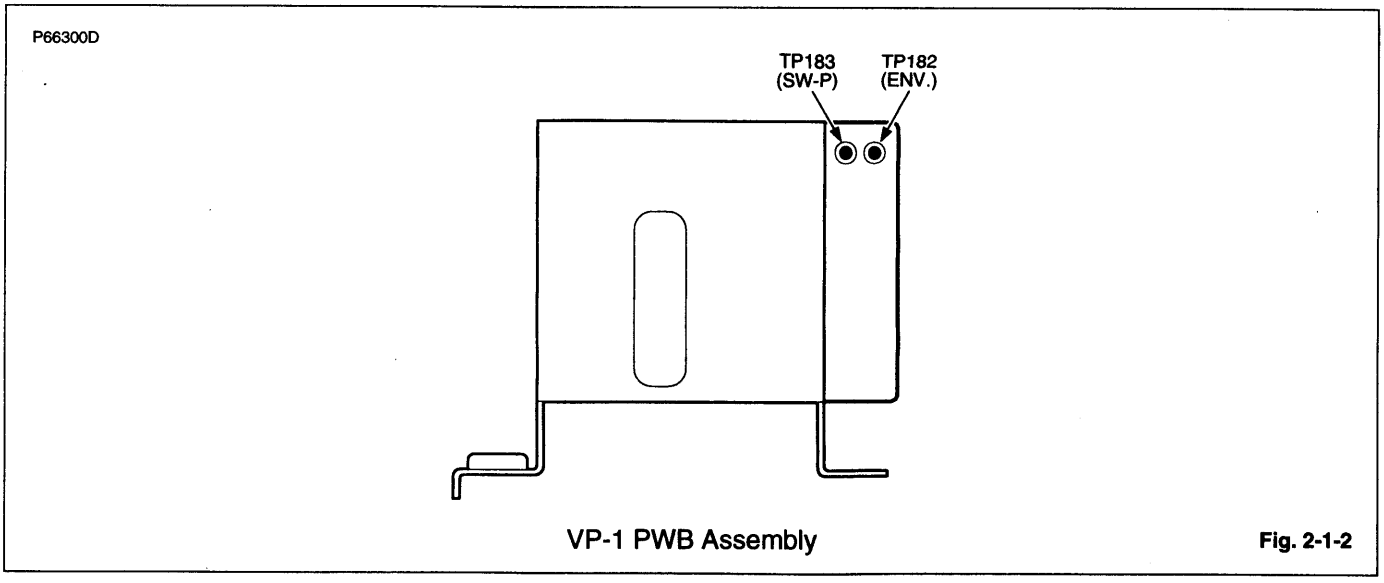
Oscilloscope	Vertical sensitivity Bandwidth	: 5 mV/DIV, external trigger : more than 10 MHz
Alignment Tape	VHJ-0009 or VHJ-0023	: SP mode, monoscope, 6 KHz
Blank Tape	VHS-type cassette tape	
Monitor TV		

2-1-2. LOCATION OF ADJUSTMENT POINTS



CP-1 PWB (Foil side)

Fig. 2-1-1



VP-1 PWB Assembly

Fig. 2-1-2

2-1-3. SWITCHING POSITION ADJ.

Measuring Point	Measuring Equipment	Adj. Condition
TP101 (VIDEO OUT) TP183 (SW-P)	Oscilloscope	PLAY mode Alignment tape (VHJ-0009 or VHJ-0023)

Adj. Location	Adj. Value
VR351 (SW-P)	6.5 H ± 0.5 H

1. Play back the alignment tape.
2. Set the tracking control position to the center by pressing CHANNEL buttons (+) and (−) simultaneously.
3. Adjust VR351 (SW-P) so that the width of "T" becomes 6.5 H ± 0.5 H as shown in Fig. 2-1-3.

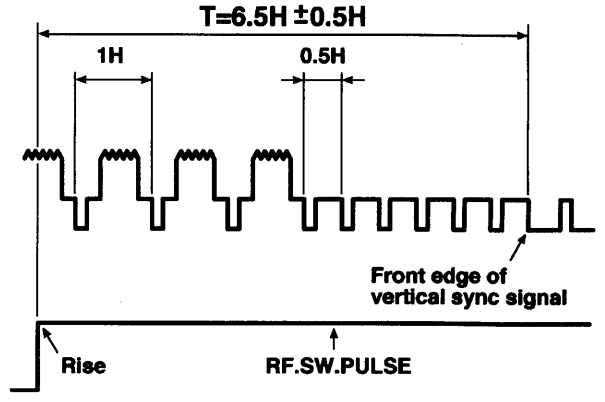


Fig. 2-1-3

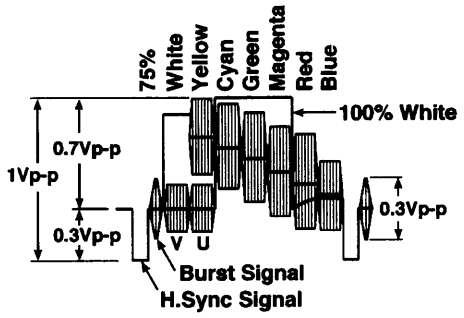
2-2. VIDEO CIRCUIT RELAY JIG

2-2-1. TEST EQUIPMENT AND STANDARDS REQUIRED

Color Bar Signal Generator	PAL Color bar signel with 100% white level (EBU color bar signel)
Oscilloscope	Vertical sensitivity : 5 mV/DIV, external trigger Bandwidth : more than 10 MHz
Oscilloscope Probe	Input capacity : less than 25 pF (10:1) less than 40 pF (1:1) Covering frequency : DC ~ 40 MHz (10:1) DC ~ 30 MHz (1:1)
Digital Voltmeter	DC range
Alignment Tape	VHJ-0008 or VHJ-0023 : SP mode, color bar, 1 kHz (Color bar signal waveform is described below. Refer to Fig. 2-2-1)
Relay Jig	VHJ-0065 : 5-wire flat cable for VP-1 PWB assembly

ALIGNMENT TAPE COLOR BAR SIGNAL

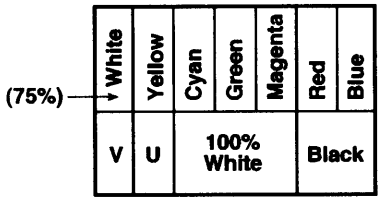
WPV-TCS



Color bar signal waveform (VHJ-0008)

Fig. 2-2-1

WPV-TCP



Color bar pattern (VHJ-0008) on monitor TV

Fig. 2-2-2

RELAY JIG

Connect the flat cable end from the cylinder assembly to the VP-1 PWB assembly using the relay jig to provide simple repairing of the VP-1 PWB assembly, as shown in Fig.2-2-3. Further, when adjusting the VP-1 PWB assembly, be sure to make contact an end of shield case with bracket of the VP-1 PWB assembly to maintain the shield effect. If the VP-1 PWB assembly does not contact, there is insufficient ground and no proper play back image can be obtained.

RJ-MP4/GSY

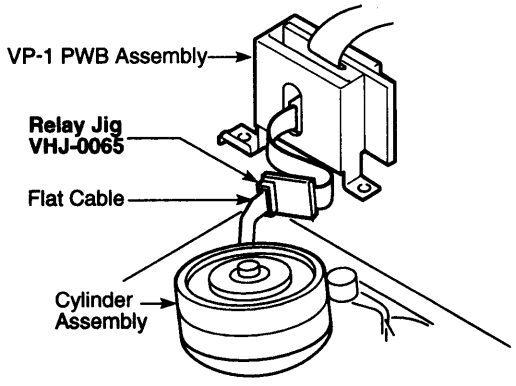


Fig. 2-2-3

2-3. IF CIRCUIT ADJUSTMENT

- In this model, the circuits of the TUNER, IF, and RF converter have been made into one. Therefore, should one circuit malfunction, the whole unit must be replaced.
- The adjustments for the IF (RF AGC) circuit of the 3 in 1 tuner are described below.

Note: The 3 in tuner dose not need any adjustments, because precise adjustments were down before shipment.

2-3-1. TEST EQUIPMENT AND STANDARD REQUIRED

Monitor TV	

2-3-2. LOCATION OF ADJUSTMENT POINT

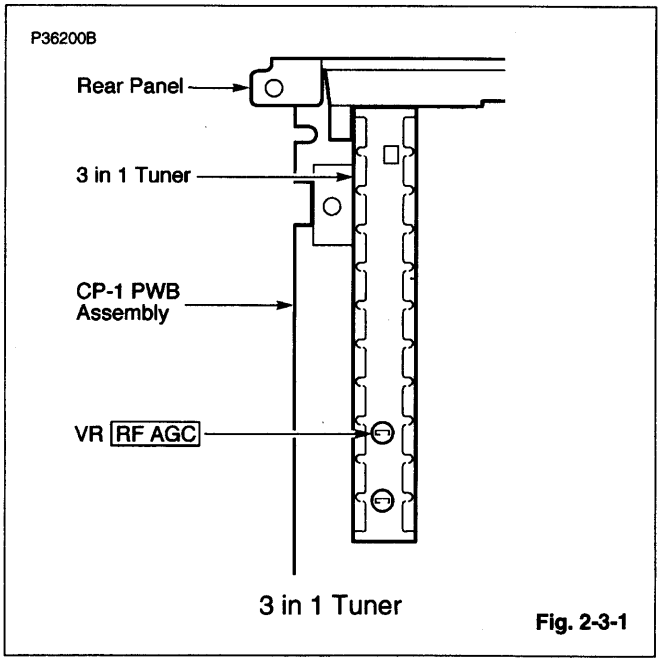


Fig. 2-3-1

2-3-3. RF AGC ADJ.

Measuring Point	Measuring Equipment	Adj. Condition
Picture of monitor TV	Monitor TV	E-E mode

Adj. Location	Adj. Value
VR (RF AGC) (on the 3 in 1 tuner)	S/N is best point

1. Connect the monitor TV to the VHF/UHF antenna output terminal.
2. Connect the VHF or UHF antenna to the VHF/UHF antenna input terminal.
3. Receive the middle electrical field (70 dBμ ~ 90 dBμ) of the VHF or UHF channel, and slowly turn the VR (RF AGC) from the point where snow-noise is present to the point where it just disappears from the monitor TV.
4. Confirm by monitor TV that there is no beat and saturation (S/N is best point) when receiving any TV channel.

2-4. CHECKING THE RF CHANNEL

If the TV and VCR are connected by an aerial output cable which has poor shielding characteristics, turn off the RF converter of the VCR and use the VCR with an AV cable. To turn the RF converter off, input "00" when setting the RF (when "RF" is displayed) during VCR pre-setting.

3. TEST POINTS FOR TAPE PATH ADJUSTMENT

Test points TP182 (ENV) and TP183 (SW-P) for tape path adjustment are shown in figure below.
For adjustment, refer to the separate volume "V95 I Mechanism Manual" (MM531433) and "V95 II Mechanism Manual" (MS531500).

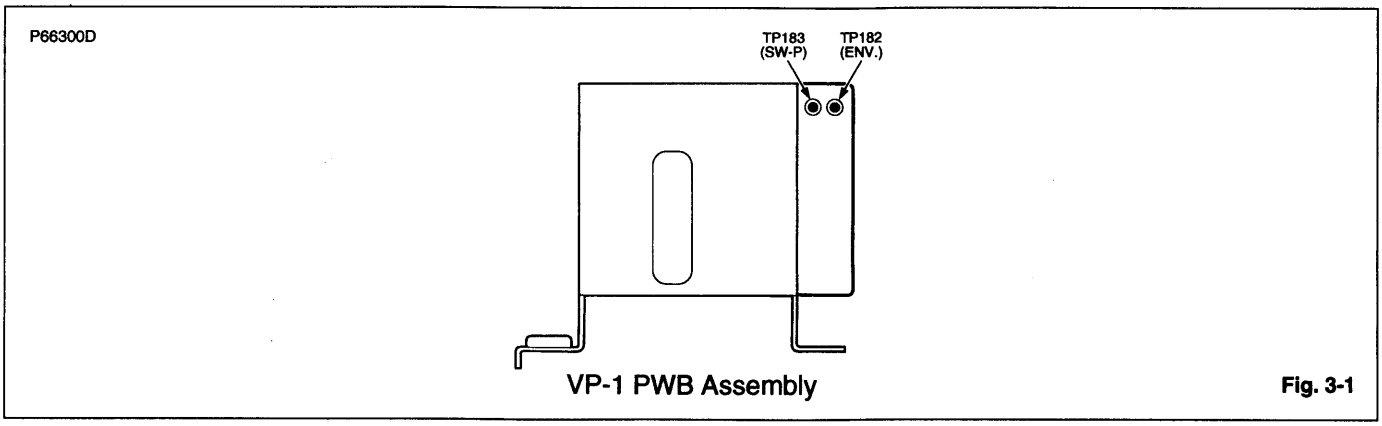


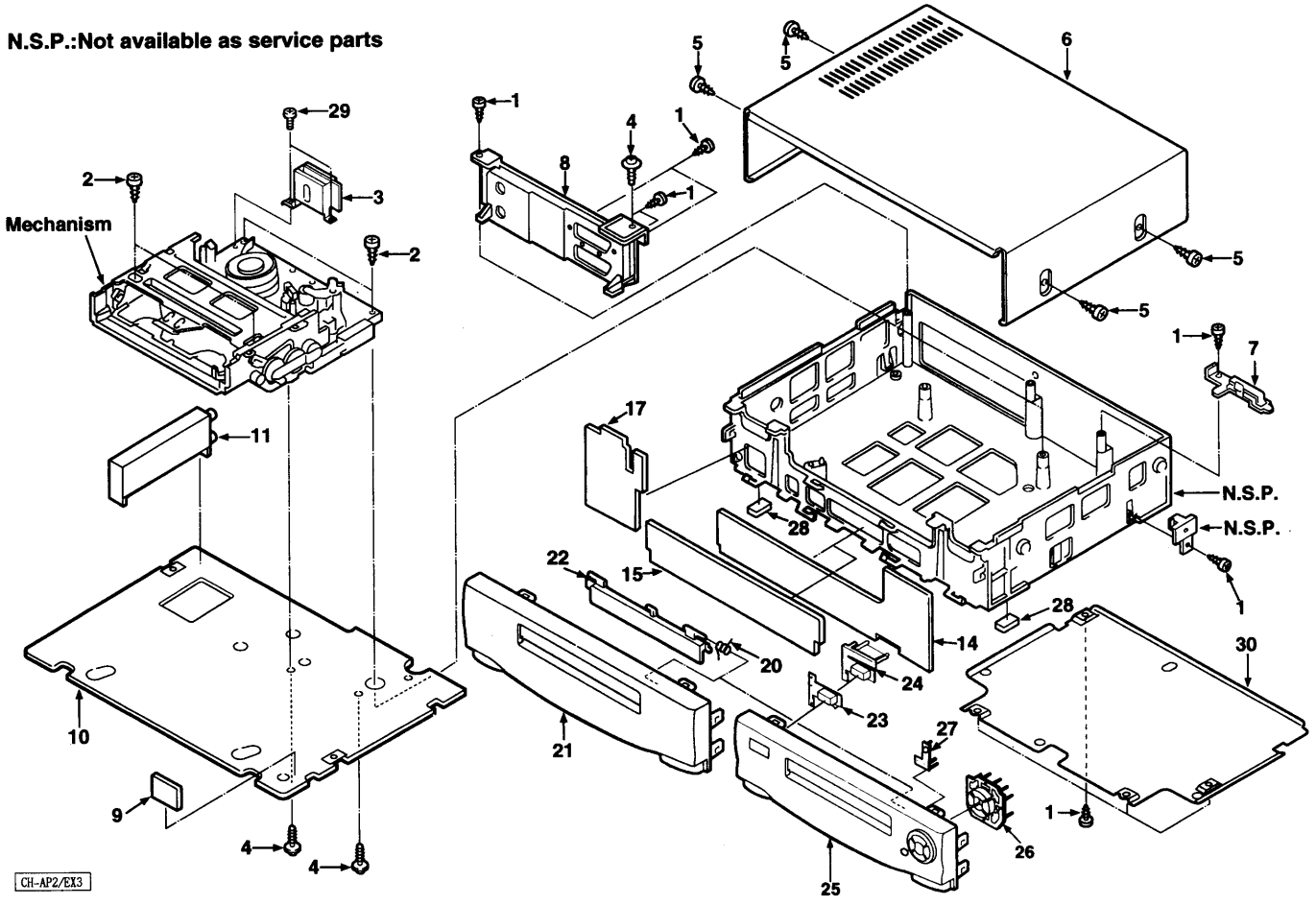
Fig. 3-1

4. PARTS LIST

CABINET & CHASSIS PARTS

LOCATION	PARTS NO.	DESCRIPTION
1	411 137 0007	SCR L-TPG BIN 3X10
2	411 021 7907	SCR S-TPG BIN 4X12
3	613 179 3088	COMPL PWB,VP-1
4	412 052 5108	SPECIAL SCREW-2.6X12
5	412 028 9406	SPECIAL SCREW
6	613 163 4794	COVER TOP, EXCEPT VHR-248EX,VHR-258EV,VHR-258EV+
OR	613 177 5404	COVER TOP, EXCEPT VHR-248EX,VHR-258EV,VHR-258EV+
6	613 177 5381	COVER TOP, VHR-248EX,VHR-258EV,VHR-258EV+
6	613 160 6036	COVER TOP,VHR-248EX ONLY
6	613 160 6036	COVER TOP,VHR-258EV,VHR-258EV+
7	613 160 2885	HOLDER
8	613 173 7075	TERMINAL,VHR-268SP,VHR-278SP
8	613 173 5620	TERMINAL,EXCEPT VHR-268SP,VHR-278SP
9	613 179 1091	COMPL PCB,TM-9,Built in :VHR-278EX,VHR-278G (Option : EXCEPT VHR-278EX,VHR-278G)
10	613 180 6900	COMPL PWB,CP-1-A,VHR-278G ONLY
10	613 180 6887	COMPL PWB,CP-1-A,VHR-258EV,VHR-258EV+
10	613 180 5965	COMPL PWB,CP-1-A,VHR-278SP ONLY
10	613 179 9714	COMPL PWB,CP-1-A,VHR-248EX ONLY
10	613 179 5617	COMPL PWB,CP-1-A,VHR-278EX ONLY
10	613 179 5587	COMPL PWB,CP-1-A,VHR-268SP ONLY
11	645 019 0063	TUNER,RF/TU/IF
14	613 178 9944	COMPL PWB,TM-1,VHR-278EX ONLY
15	613 180 5972	COMPL PWB,TM-1,VHR-248EX,VHR-278G
15	613 179 3002	COMPL PWB,TM-1,VHR-268SP,VHR-278SP, VHR-258EV,VHR-258EV+
17	613 178 9951	COMPL PWB,TM-2,VHR-278EX ONLY
20	613 153 0478	SPRING
21	613 180 6009	ASSY,CABINET FRONT SID,VHR-278SP ONLY
21	613 180 1707	ASSY,CABINET FRONT SID,VHR-258EV ONLY
21	613 182 9572	ASSY,CABINET FRONT SID,VHR-258EV+ ONLY
21	613 180 7440	ASSY,CABINET FRONT SID,VHR-278G ONLY
21	613 179 9035	ASSY,CABINET FRONT SID,VHR-248EX ONLY
21	613 179 4931	ASSY,CABINET FRONT SID,VHR-268SP ONLY
22	613 180 7600	DOOR CASSETTE,VHR-258EV,VHR-258EV+
22	613 180 7587	DOOR CASSETTE,VHR-278G ONLY
22	613 180 6078	DOOR CASSETTE,VHR-278SP ONLY
22	613 179 9158	DOOR CASSETTE,VHR-248EX ONLY
22	613 179 5235	DOOR CASSETTE,VHR-268SP ONLY
22	613 179 5211	DOOR CASSETTE,VHR-278EX ONLY
23	613 178 9777	BUTTON,VHR-278EX ONLY
24	613 179 0285	HOLDER,VHR-278EX ONLY
25	613 179 5013	ASSY,CABINET FRONT SID,VHR-278EX ONLY
26	613 178 9760	BUTTON 5P,VHR-278EX ONLY
27	613 178 9784	BUTTON,VHR-278EX ONLY
28	613 121 1001	STAND,FELT, (FRONT)
29	411 001 1901	SCR S-TPG BIN 3X6
30	613 160 5091	COVER BOTTOM

N.S.P.:Not available as service parts

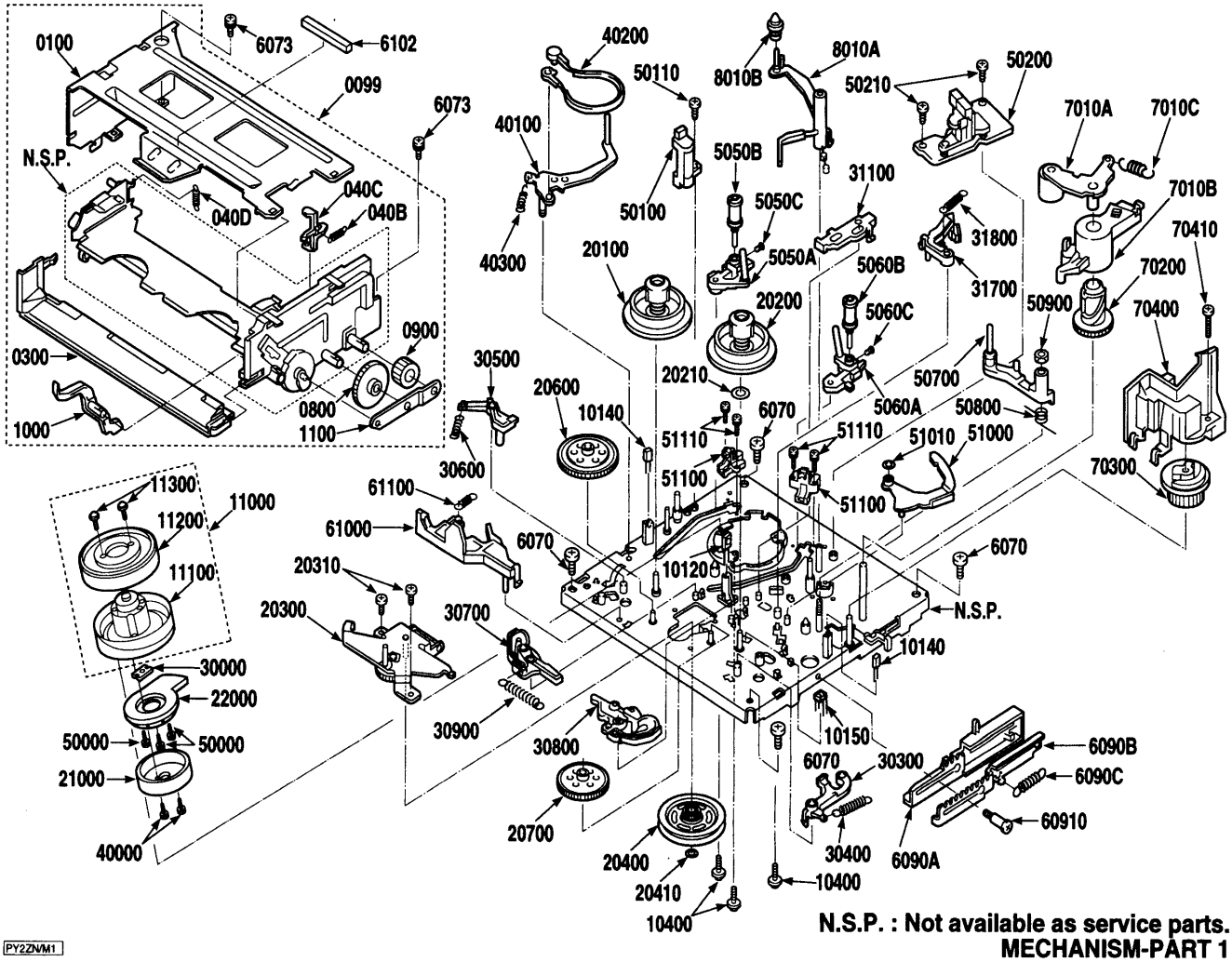


MECHANISM PARTS

LOCATION	PARTS NO.	DESCRIPTION
MECHANISM PARTS 1		
11000	613 142 9574	COMPL,CYLINDER,2N2S-V
11100	613 108 6241	ASSY,CYLINDER,LWR 2AL
11200	613 114 2831	ASSY,CYLINDER,UPR 2N2S-V
11300	411 038 1608	SCR PAN+W 3X8
21000	645 015 7875	MOTOR,ROTOR,CYL DC 2W
22000	645 026 7802	MOTOR,STATOR,CYL DC 2W
OR	645 015 7868	MOTOR,STATOR,CYL DC 2W
30000	613 081 4036	SPACER,MOTOR
40000	412 036 5001	SPECIAL SCREW 2.3X6
50000	412 036 4905	SPECIAL SCREW 2.3X10
6073	412 048 8205	SPECIAL SCREW-2.6X6
6102	613 151 6618	PAD
0099	613 152 0578	COMPL,CASSETTE MECHANISM
0100	613 152 0738	STAND L
0300	613 152 0660	FRAME UNDER
040B	613 152 0417	SPRING,LID OPENER
040C	613 152 0707	LEVER,RELEASE
040D	613 152 0424	SPRING,TRAY LOCK
0800	613 152 2794	GEAR,LOCK
0900	613 152 2800	GEAR,PINION
1000	613 151 9480	LEVER,DOOR OPENER
1100	613 151 9299	HOLDER,GEAR
6070	411 021 7907	SCR S-TPG BIN 4X12
10120	407 162 1102	LED LN59L(D8003)
10140	407 162 8705	PHOTO DIODE PN263L-(NC) (D8001,D8002) S,T SENSOR
10150	407 165 8108	PHOTO COUPLE SG-105F(PC801)
OR	407 043 0101	PHOTO DIODE ON2170-R(PC801)

LOCATION	PARTS NO.	DESCRIPTION
10400	412 052 6204	SPECIAL SCREW-2.6X5.5
20100	613 169 0974	REEL,SUPPLY
OR	613 160 5503	ASSY,REEL SUPPLY
20200	613 160 4193	ASSY,REEL TAKE UP
OR	613 168 1514	ASSY,REEL TAKE UP
20210	412 015 8504	SPECIAL WASHER 3.1X6X0.5
OR	412 015 8900	SPECIAL WASHER 3.1X6X0.4
OR	412 021 5306	SPECIAL WASHER 3.1X6X0.3
20300	613 175 0661	COMPL,MOUNTING CLUTCH
OR	613 171 6896	COMPL,MOUNTING CLUTCH
20310	412 048 7505	SPECIAL SCREW-2.6X4
20400	613 151 9701	PULLEY,REEL
20410	412 045 4606	SPECIAL WASHER 2.4X6X0.25
20600	613 152 2749	GEAR,REEL S
20700	613 152 2756	GEAR,REEL T
30300	613 160 3356	ASSY,BRAKE SOFT T
30400	613 152 0295	SPRING,SOFT T
30500	613 151 9411	LEVER,SOFT S
30600	613 152 0318	SPRING,SOFT S
30700	613 160 6166	ASSY,BRAKE,S
30800	613 159 2193	ASSY,BRAKE T
30900	613 163 6996	SPRING,BRAKE
31100	613 152 0189	SLIDE,ACT BRAKE T
31700	613 151 8490	ASSY,BRAKE CAPSTAN
31800	613 152 0356	SPRING,BRAKE CAPSTAN
40100	613 151 8759	ASSY,LEVER,BT
40200	613 160 5282	ASSY,BRAKE,BAND
40300	613 152 0271	SPRING,BT
50100	645 017 6432	HEAD,ERASE FULL
50110	412 048 9707	SPECIAL SCREW-2.6X10

Note:
Location No. 8010A and 8010B are used on VHR-268SP,VHR-278SP.



N.S.P. : Not available as service parts.

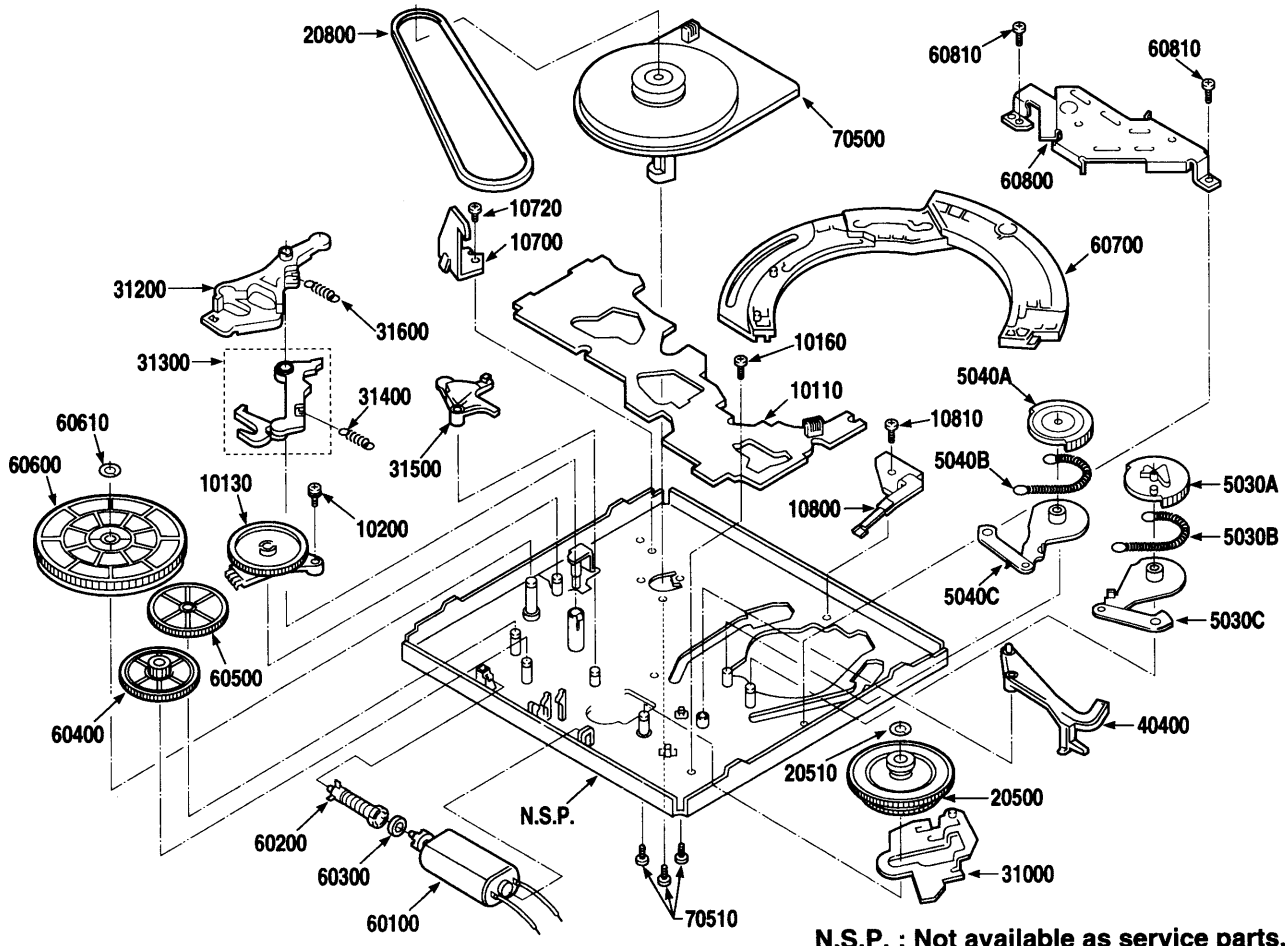
MECHANISM-PART 1

PY2ZNM1

LOCATION	PARTS NO.	DESCRIPTION
50200	613 176 8406	ASSY,HEAD R/P ACE
50210	412 052 3500	SPECIAL SCREW 2.6X12
5050A	613 164 7237	ASSY,MOUNTING,INCLINE S
5050B	613 022 0233	ASSY,GUIDE,ROLLER
5050C	412 048 4504	SPECIAL SCREW-2X3
5060A	613 164 7251	ASSY,MOUNTING,INCLINE T
5060B	613 022 0233	ASSY,GUIDE,ROLLER
5060C	412 048 4504	SPECIAL SCREW-2X3
50700	613 164 4762	ASSY,LEVER,LOAD
50800	613 152 0387	SPRING,LEVER L GUIDE
50900	412 048 8908	SPECIAL NUT-3X3
51000	613 173 6153	ASSY,LEVER,ACT L GUIDE
OR	613 161 2365	ASSY,LEVER,ACT L GUIDE
51010	412 033 4106	WASHER SLIT 2.6X5X0.50
51100	613 160 7057	MOUNTING,CATCHER
51110	412 049 1700	SPECIAL SCREW-2.6X10
6090A	613 151 9152	GEAR,RACK FRONT
OR	613 160 4636	GEAR,RACK FRONT
6090B	613 151 9114	GEAR,RACK START
6090C	613 152 0226	SPRING,RACK FRONT
60910	412 050 2802	SPECIAL SCREW-2.6X6
61000	613 151 9398	LEVER,EP SW
61100	613 152 3692	SPRING,EP SW
7010A	613 175 1194	ASSY,LEVER,PINCH ROLLER
OR	613 151 8803	ASSY,LEVER,PINCH ROLLER
7010B	613 171 0221	MOUNTING,LIFT PINCH
7010C	613 152 0233	SPRING,PINCH ROLLER
70200	613 156 3841	CAM,LIFT PINCH
70300	613 152 0677	GEAR,CAM PINCH
70400	613 152 0714	MOUNTING,OPENER
70410	412 049 1106	SPECIAL SCREW-2.6X16
8010A	613 171 9606	LEVER,CLEANER,VHR-268SP,VHR-278SP
8010B	613 171 9439	ASSY,MOUNTING CLEANER, VHR-268SP,VHR-278SP

MECHANISM PARTS 2

LOCATION	PARTS NO.	DESCRIPTION
10110	613 173 9451	COMPL PWB,MC-1
10130	645 007 1560	SWITCH,MODE(S8001)
10160	412 048 7505	SPECIAL SCREW-2.6X4
10200	412 048 8304	SPECIAL SCREW-2.6X8
10700	613 167 5926	MOUNTING CAPSTA
10720	412 048 8007	SPECIAL SCREW-2.6X6
10800	613 165 8523	ASSY,EARTH CYL
10810	412 048 8007	SPECIAL SCREW-2.6X6
20500	613 160 4186	ASSY,GEAR,FRICTION
20510	411 109 1605	WASHER Y 2.6X6X0.25
20800	613 151 9039	BELT,REEL
31000	613 152 0165	SLIDE,ACT BRAKE S
31200	613 159 0991	LEVER,CONTROL BRAKE
31300	613 159 0847	COMPL,LEVER,ACT BRAKE
31400	613 152 0332	SPRING,RETURN BRAKE
31500	613 151 9459	LEVER,CHANGE CLUTCH
31600	613 152 0349	SPRING,CHANGE CLUTCH
40400	613 153 7583	ASSY,LEVER SPRING BT
5030A	613 152 2763	GEAR,LOAD S
5030B	613 152 0370	SPRING,LOAD S
5030C	613 160 3691	ASSY,LEVER,LOAD S
5040A	613 152 2770	GEAR,LOAD T
5040B	613 152 0363	SPRING,LOAD T
5040C	613 160 3707	ASSY,LEVER,LOAD T
60100	645 003 4305	ASSY,MOTOR LOADING
60200	613 151 8599	COMPL,GEAR,WORM
60300	613 151 9107	DAMPER
60400	613 151 9138	GEAR,WHEEL 1
60500	613 160 3790	GEAR,WHEEL 2
60600	613 156 4008	CAM,MAIN
60610	412 054 6806	SPECIAL WASHER 3.6X0.5
60700	613 159 9017	SLIDE,CRESCENT
60800	613 159 8997	MOUNTING,CRESCENT
60810	412 048 8007	SPECIAL SCREW-2.6X6
70500	645 026 7826	MOTOR,CAPSTAN DC 3W
70510	412 048 7604	SPECIAL SCREW-2.6X6



N.S.P. : Not available as service parts.

MECHANISM-PART 2

MA4/U4-M2

ELECTRICAL PARTS

Note:

1. Materials of Capacitors and Resistors are abbreviated as follows ;

Resistors		Capacitors	
MT-FILM	Metallized Film Resistor	MT-POLYEST	Metallized Polyester Capacitor
MT-GLAZE	Metallized Glaze Resistor	MT-COMPO	Metallized Composite Capacitor
OXIDE-MT	Oxide Metallized Film Resistor	TA-SOLD	Tantalum Solid Capacitor
		AL-SOLID	Aluminum Solid Capacitor
		NP-ELECT	Non-Polarized Electrolytic Capacitor
		OS-SOLID	Aluminum Solid Capacitors with Organic Semiconductive Electrolytic Capacitor
		DL-ELECT	Double Layered Electrolytic Capacitor

2. Tolerance of Capacitor (10pF over) and Resistor are noted with follow symboles.
   F .....1% G .....2% J .....5% K 10%
   M .....20% N .....30% Z .....+80% ~ -20%
3. Capacitors
   U : μF P : pF
4. Inductors
   UH : μH MH : mH
5. N.S.P. : Not available as service parts.

LOCATION	PARTS NO.	DESCRIPTION
COMPL PWB,CP-1-A		
	613 180 6900	VHR-278G ONLY
	613 180 6887	VHR-258EV,VHR-258EV+
	613 180 5965	VHR-278SP ONLY
	613 179 9714	VHR-248EX ONLY
	613 179 5617	VHR-278EX ONLY
	613 179 5587	VHR-268SP ONLY
	(CONNECTORS)	
CN231	645 021 1508	SOCKET,RGB 21P (N.S.P), EXCEPT VHR-268SP,VHR-278SP
OR	645 026 1602	SOCKET,RGB 21P (N.S.P), EXCEPT VHR-268SP,VHR-278SP
CN231	645 026 1619	SOCKET,RGB 21P (N.S.P), VHR-268SP,VHR-278SP
OR	645 021 1522	SOCKET,RGB 21P (N.S.P), VHR-268SP,VHR-278SP
CN301	645 009 4361	SOCKET,FFC 31P (N.S.P)
OR	645 005 4761	SOCKET,31P (N.S.P)
CN303	645 007 8422	PLUG,12P (N.S.P)
CN351	645 007 8927	PLUG,6P (N.S.P)
CN352	645 008 1842	PLUG,8P (N.S.P)
CN501	⚠ 645 000 5411	SOCKET,INLET AC (N.S.P)
OR	⚠ 645 028 4885	SOCKET,INLET AC (N.S.P)
	(SEMICONDUCTORS)	
Q1002	405 035 6100	TR 2SC2413K-Q
Q1004	405 014 4608	TR 2SC2412K-S
OR	405 014 4509	TR 2SC2412K-R
Q1005	405 014 4608	TR 2SC2412K-S
OR	405 014 4509	TR 2SC2412K-R
Q1007	405 002 0407	TR 2SA1037K-S,VHR-278EX,VHR-278G
OR	405 002 0308	TR 2SA1037K-R,VHR-278EX,VHR-278G
Q1101	405 002 0407	TR 2SA1037K-S
OR	405 002 0308	TR 2SA1037K-R
Q1102	405 014 4608	TR 2SC2412K-S
OR	405 014 4509	TR 2SC2412K-R
Q1301	405 006 1806	TR 2SA933S-R
Q1303	405 006 1806	TR 2SA933S-R,VHR-268SP,VHR-278SP
Q1304	405 002 0407	TR 2SA1037K-S
OR	405 002 0308	TR 2SA1037K-R
Q1402	405 002 0407	TR 2SA1037K-S,VHR-278EX,VHR-278G
OR	405 002 0308	TR 2SA1037K-R,VHR-278EX,VHR-278G
Q2021	405 018 0200	TR 2SC3331-U
OR	405 018 0002	TR 2SC3331-S
OR	405 018 0101	TR 2SC3331-T
Q2022	405 025 0200	TR 2SD734-G
OR	405 024 9907	TR 2SD734-F
Q2023	405 003 5807	TR 2SA1318-U
OR	405 003 5609	TR 2SA1318-S
OR	405 003 5708	TR 2SA1318-T
Q2024	405 018 0200	TR 2SC3331-U
OR	405 018 0101	TR 2SC3331-T
OR	405 018 0002	TR 2SC3331-S

LOCATION	PARTS NO.	DESCRIPTION
Q2025	405 018 0101	TR 2SC3331-T
OR	405 018 0002	TR 2SC3331-S
OR	405 018 0200	TR 2SC3331-U
Q2341	405 064 0209	TR 2SA1561-R
OR	405 123 6807	TR 2SB1320A-R
OR	405 123 6708	TR 2SB1320A-Q
OR	405 064 0100	TR 2SA1561-Q
Q2342	405 015 8407	TR 2SC2812-L5
OR	405 014 4509	TR 2SC2412K-R
OR	405 015 8704	TR 2SC2812-L6
OR	405 014 4608	TR 2SC2412K-S
Q2371	405 083 5209	TR DTC343TK,VHR-278EX,VHR-278G
Q2372	405 000 2007	TR DTA144EK,VHR-278EX,VHR-278G
Q2391	405 002 0407	TR 2SA1037K-S,VHR-268SP,VHR-278SP
OR	405 002 6706	TR 2SA1179-M6,VHR-268SP,VHR-278SP
OR	405 002 6508	TR 2SA1179-M5,VHR-268SP,VHR-278SP
OR	405 002 0308	TR 2SA1037K-R,VHR-268SP,VHR-278SP
Q2392	405 029 3504	TR DTC144EK,VHR-268SP,VHR-278SP
Q3051	405 018 1900	TR 2SC3395
OR	405 029 3504	TR DTC144EK
Q3052	405 000 0409	TR DTA114EK
Q3504	405 029 3504	TR DTC144EK
Q3553	405 014 4509	TR 2SC2412K-R
OR	405 014 4608	TR 2SC2412K-S
Q5002	405 089 2202	TR 2SC4483-T
Q5101	405 029 4501	TR 2SD1858-R
OR	405 089 2202	TR 2SC4483-T
OR	405 089 2103	TR 2SC4483-S
OR	405 104 3108	TR 2SD1858-Q
Q5102	405 104 3108	TR 2SD1858-Q
OR	405 089 2103	TR 2SC4483-S
OR	405 029 4501	TR 2SD1858-R
OR	405 089 2202	TR 2SC4483-T
Q5103	405 013 7303	TR 2SC2274K-F
OR	405 013 7006	TR 2SC2274-F
OR	405 013 6801	TR 2SC2274-E
OR	405 013 7204	TR 2SC2274K-E
Q5104	405 125 3200	TR 2SC5070
Q5105	405 099 8607	TR 2SC4640T
OR	405 011 8500	TR 2SC1740S-R
OR	405 093 0607	TR KSC2785-Y
OR	405 099 8508	TR 2SC4640S
OR	405 011 8401	TR 2SC1740S-Q
Q5110	405 083 6305	TR DTB113ZK
Q5111	405 000 2007	TR DTA144EK
Q5112	405 000 4100	TR DTC124EK
Q5113	405 000 2908	TR DTC114EK
Q5114	405 125 3200	TR 2SC5070
Q5115	405 029 3504	TR DTC144EK
Q5116	405 000 4100	TR DTC124EK
Q5117	405 138 7905	TR DTC123JKA
Q5131	405 125 3200	TR 2SC5070
Q5132	405 000 2007	TR DTA144EK
Q5133	405 000 2908	TR DTC114EK

LOCATION	PARTS NO.	DESCRIPTION
Q5134	405 014 4509	TR 2SC2412K-R
OR	405 014 4608	TR 2SC2412K-S
	(INTEGRATED CIRCUITS)	
IC101	410 297 2500	IC LA71511DML-MPB
IC102	409 372 4508	IC LC89977M
IC131	409 258 5209	IC BA7630S,VHR-268SP,VHR-278SP
IC141	410 301 7903	IC LC74788JM-9696,VHR-278EX,VHR-278G
IC232	409 051 2900	IC TC4053BF,VHR-268SP,VHR-278SP
OR	409 051 2900	IC TC4053BF,VHR-268SP,VHR-278SP
IC301	410 309 6809	IC LC866744A-5G64, EXCEPT VHR-278EX,VHR-278G
IC301	410 311 3803	IC LC866852A-5G91,VHR-278EX,VHR-278G
IC302	409 314 2005	IC LB1643
IC303	409 415 0009	IC BMR03H-04
IC304	410 189 5800	IC 24LC04B/P, VHR-278SP,VHR-278EX,VHR-278G
OR	409 348 6901	IC XL24C04P,VHR-278SP,VHR-278EX,VHR-278G
OR	410 172 6906	IC X24C04PC7346, VHR-278SP,VHR-278EX,VHR-278G
OR	410 177 3702	IC AT24C04-10PC, VHR-278SP,VHR-278EX,VHR-278G
IC304	409 368 9807	IC BR24C01A,VHR-268SP,VHR-248EX, VHR-258EV,VHR-258EV+
OR	410 189 5602	IC 24LC01B/P,VHR-268SP,VHR-248EX, VHR-258EV,VHR-258EV+
OR	409 348 3702	IC XL24C01AP,VHR-268SP,VHR-248EX, VHR-258EV,VHR-258EV+
IC305	410 177 3801	IC AT24C01A-10PC,VHR-268SP,VHR-248EX, VHR-258EV,VHR-258EV+
IC306	410 172 6708	IC X24C01APC7284,VHR-268SP,VHR-248EX, VHR-258EV,VHR-258EV+
IC351	409 409 2507	IC BU2923K
IC501	409 409 3801	IC MA3810-4105
IC511	409 180 2307	IC UPC1093J
	(DIODES)	
D1001	407 012 4406	DIODE 1SS133,EXCEPT VHR-278EX,VHR-278G
D1002	407 012 4406	DIODE 1SS133,EXCEPT VHR-278EX,VHR-278G
D1301	407 012 4406	DIODE 1SS133
D1302	407 012 4406	DIODE 1SS133
D1303	407 012 4406	DIODE 1SS133,VHR-268SP,VHR-278SP
D1304	407 012 4406	DIODE 1SS133,VHR-268SP,VHR-278SP
D1341	407 012 4406	DIODE 1SS133,EXCEPT VHR-268SP,VHR-278SP
D1342	407 012 4406	DIODE 1SS133,EXCEPT VHR-268SP,VHR-278SP
D1345	407 063 8804	ZENER DIODE MTZJ5.6A, VHR-268SP,VHR-278SP
D1346	407 063 8804	ZENER DIODE MTZJ5.6A, VHR-268SP,VHR-278SP
D2341	407 012 4406	DIODE 1SS133
D2371	407 099 7000	ZENER DIODE MTZJ15B
D2372	407 063 8804	ZENER DIODE MTZJ5.6A, VHR-268SP,VHR-278SP
D2373	407 099 7000	ZENER DIODE MTZJ15B, VHR-268SP,VHR-278SP
D2374	407 063 8804	ZENER DIODE MTZJ5.6A, VHR-268SP,VHR-278SP
D3001	407 012 4406	DIODE 1SS133
D3003	407 012 4406	DIODE 1SS133
D3101	407 012 4406	DIODE 1SS133
D3103	407 012 4406	DIODE 1SS133,VHR-268SP,VHR-248EX, VHR-258EV,VHR-258EV+
D3105	407 012 4406	DIODE 1SS133,VHR-278EX,VHR-278G
D3108	407 012 4406	DIODE 1SS133,VHR-268SP,VHR-278SP
D3115	407 012 4406	DIODE 1SS133,VHR-278EX,VHR-278G (Option : EXCEPT VHR-278EX,VHR-278G)
D3118	407 012 4406	DIODE 1SS133
D3401	407 100 0006	ZENER DIODE MTZJ33C
D3502	407 012 4406	DIODE 1SS133
D5001	407 197 6509	DIODE DB155G-S
OR	407 104 5304	DIODE S1WB(A)60
D5002	407 004 9808	DIODE DSK10E
D5011	407 198 2401	DIODE SFT14
D5012	407 198 2401	DIODE SFT14
D5013	⚠407 169 5608	PHOTO COUPLE PC123U2
D5014	407 078 2705	DIODE 1SS244
D5015	407 078 2705	DIODE 1SS244
D5016	407 125 9008	ZENER DIODE MTZJ2.0A
D5019	407 078 2705	DIODE 1SS244

LOCATION	PARTS NO.	DESCRIPTION
D5101	408 038 5309	DIODE ERC81-004J11
D5102	407 205 7009	DIODE D2FS6
OR	407 205 7009	DIODE D2FS6
D5103	407 078 2705	DIODE 1SS244
D5104	407 198 2401	DIODE SFT14
D5105	407 167 8007	DIODE D1FL20U
OR	407 167 8007	DIODE D1FL20U
D5106	407 078 2705	DIODE 1SS244
D5107	407 099 5303	ZENER DIODE MTZJ5.6B
D5108	407 099 5303	ZENER DIODE MTZJ5.6B
D5109	407 099 5303	ZENER DIODE MTZJ5.6B
D5110	407 099 6508	ZENER DIODE MTZJ12A
D5111	407 099 5600	ZENER DIODE MTZJ6.8A
D5112	407 091 6902	DIODE ERA38-04
D5115	407 078 2705	DIODE 1SS244
D5116	407 120 7108	ZENER DIODE RD24MB3
OR	407 055 4807	ZENER DIODE RD24M-B2
OR	407 055 4708	ZENER DIODE RD24MB1
	(CRYSTAL DEVICES)	
X1001	645 014 8378	OSC,CRYSTAL 4.433619MHZ
OR	645 002 4436	OSC,CRYSTAL 4.433619MHZ
OR	645 000 6012	OSC,CRYSTAL 4.433619MHZ
OR	645 000 6029	OSC,CRYSTAL 4.433619MHZ
X3001	645 008 8360	OSC,CERAMIC 8.500MHZ
OR	645 007 8460	OSC,CERAMIC 8.500MHZ
X3002	613 109 0972	OSC,CRYSTAL 32KHZ
OR	645 004 1938	OSC,CRYSTAL 32.768KHZ
	(VARIABLE RESISTORS)	
VR351	645 003 5166	VR,SEMI,220K N
OR	645 003 5593	VR,SEMI,220K N
OR	645 006 5538	VR,SEMI,220K N
	(INDUCTORS)	
L1002	645 003 7948	INDUCTOR,120U J
OR	645 001 4611	INDUCTOR,120U J
L1003	645 002 1510	INDUCTOR,68U J
OR	645 003 8228	INDUCTOR,68U J
L1101	645 025 0644	INDUCTOR,0.75UH
L1102	645 025 0644	INDUCTOR,0.75UH
L1401	645 001 5472	INDUCTOR,33U J,VHR-278EX,VHR-278G
OR	645 003 8105	INDUCTOR,33U J,VHR-278EX,VHR-278G
L1402	645 001 4642	INDUCTOR,22U J,VHR-278EX,VHR-278G
OR	645 003 8013	INDUCTOR,22U J,VHR-278EX,VHR-278G
L1404	645 002 1442	INDUCTOR,18U J,VHR-278EX,VHR-278G
OR	645 003 7986	INDUCTOR,18U J,VHR-278EX,VHR-278G
L2021	645 003 6934	INDUCTOR,100U J
OR	645 003 7634	INDUCTOR,100U J
L2371	645 025 0644	INDUCTOR,0.75UH
L2372	645 025 0644	INDUCTOR,0.75UH,VHR-268SP,VHR-278SP
L3001	645 025 0644	INDUCTOR,0.75UH
L3003	645 025 0644	INDUCTOR,0.75UH
L3301	645 001 4550	INDUCTOR,10U K
OR	645 003 7900	INDUCTOR,10U K
L3304	645 006 3886	INDUCTOR,1U K
OR	645 005 3856	INDUCTOR,1U M
L5001	S645 013 5620	LINE FILTER
L5101	645 011 6957	INDUCTOR,10U
L5102	645 024 3417	INDUCTOR,2.0UH
OR	645 006 3602	INDUCTOR,1.1UH
	(TRANSFORMERS)	
T2001	645 018 3515	TRANS,OSC,70KHZ
T5001	⚠645 027 3599	TRANS,POWER,PULSE
	(CAPACITORS)	
C1001	403 191 8709	ELECT 1U M 50V
C1002	403 189 2405	ELECT 10U M 16V
C1003	403 135 4002	ELECT 47U M 6.3V
C1004	403 068 0409	CERAMIC 0.1U Z 25V
C1005	403 163 7907	ELECT 47U M 6.3V
C1006	403 068 0409	CERAMIC 0.1U Z 25V
C1007	403 191 8709	ELECT 1U M 50V
C1009	403 191 8709	ELECT 1U M 50V
C1010	403 014 9302	CERAMIC 180P J 50V
C1011	403 023 4503	CERAMIC 330P J 50V
C1012	403 020 0508	CERAMIC 27P J 50V
C1013	403 150 6500	ELECT 22U M 16V
C1014	403 069 5601	CERAMIC 0.01U K 50V
C1015	403 020 0508	CERAMIC 27P J 50V
C1016	403 001 1906	CERAMIC 0.01U M 16V

LOCATION	PARTS NO.	DESCRIPTION
C1017	403 001 1906	CERAMIC 0.01U M 16V
C1018	403 130 3109	CERAMIC 0.047U K 50V
C1019	403 191 8709	ELECT 1U M 50V
C1021	403 130 3109	CERAMIC 0.047U K 50V
C1022	403 109 6308	ELECT 1U M 50V
C1023	403 130 3109	CERAMIC 0.047U K 50V
C1024	403 192 5905	CERAMIC 0.1U K 25V
C1025	403 069 5601	CERAMIC 0.01U K 50V
C1026	403 191 8709	ELECT 1U M 50V
C1027	403 072 1607	CERAMIC 0.022U K 50V
C1028	403 191 8709	ELECT 1U M 50V
C1029	403 163 7907	ELECT 47U M 6.3V
C1030	403 068 0409	CERAMIC 0.1U Z 25V
C1031	403 069 5601	CERAMIC 0.01U K 50V
C1032	403 191 8709	ELECT 1U M 50V
C1033	403 014 3409	CERAMIC 18P J 50V
C1040	403 189 2405	ELECT 10U M 16V
C1041	403 020 0409	CERAMIC 27P J 50V
C1043	403 086 2805	NP-ELECT 1U M 50V, EXCEPT VHR-268SP,VHR-278SP
C1044	403 026 2803	CERAMIC 47P J 50V, EXCEPT VHR-268SP,VHR-278SP
C1047	403 026 2803	CERAMIC 47P J 50V
C1048	403 012 6907	CERAMIC 15P J 50V
C1050	403 012 6907	CERAMIC 15P J 50V, VHR-278EX,VHR-278G
C1050	403 022 8304	CERAMIC 33P J 50V, EXCEPT VHR-278EX, VHR-278G
C1051	403 026 2803	CERAMIC 47P J 50V
C1101	403 191 8709	ELECT 1U M 50V
C1102	403 163 7907	ELECT 47U M 6.3V
C1103	403 068 0409	CERAMIC 0.1U Z 25V
C1104	403 069 5601	CERAMIC 0.01U K 50V
C1105	403 069 5601	CERAMIC 0.01U K 50V
C1106	403 069 5601	CERAMIC 0.01U K 50V
C1107	403 069 5601	CERAMIC 0.01U K 50V
C1108	403 192 5905	CERAMIC 0.1U K 25V
C1109	403 068 0409	CERAMIC 0.1U Z 25V
C1301	403 135 4101	ELECT 470U M 6.3V
C1303	403 068 0409	CERAMIC 0.1U Z 25V
C1341	403 154 2102	NP-ELECT 1U M 50V, VHR-268SP,VHR-278SP
C1342	403 010 1102	CERAMIC 1000P J 50V, VHR-268SP,VHR-278SP
C1344	403 154 2102	NP-ELECT 1U M 50V, VHR-268SP,VHR-278SP
C1346	403 107 9905	ELECT 10U M 16V,VHR-268SP,VHR-278SP
C1351	403 107 9905	ELECT 10U M 16V,VHR-268SP,VHR-278SP
C1352	403 086 2805	NP-ELECT 1U M 50V, VHR-268SP,VHR-278SP
C1352	403 191 8709	ELECT 1U M 50V, EXCEPT VHR-268SP,VHR-278SP
C1401	403 022 8205	CERAMIC 33P J 50V, VHR-278EX,VHR-278G
C1403	403 109 6308	ELECT 1U M 50V,VHR-278EX,VHR-278G
C1404	403 069 9500	CERAMIC 0.01U Z 50V, VHR-278EX,VHR-278G
C1404	403 071 8102	CERAMIC 2200P K 50V, VHR-268SP,VHR-278SP
C1405	403 135 4002	ELECT 47U M 6.3V,VHR-278EX,VHR-278G
C1406	403 018 0503	CERAMIC 22P J 50V, VHR-278EX,VHR-278G
C1407	403 018 0503	CERAMIC 22P J 50V, VHR-278EX,VHR-278G
C1410	403 009 5807	CERAMIC 100P J 50V, VHR-278EX,VHR-278G
C1411	403 070 5508	CERAMIC 1200P K 50V, VHR-278EX,VHR-278G
C1412	403 109 6308	ELECT 1U M 50V,VHR-278EX,VHR-278G
C1414	403 014 3508	CERAMIC 18P J 50V, VHR-278EX,VHR-278G
C1419	403 069 9500	CERAMIC 0.01U Z 50V, VHR-278EX,VHR-278G
C2001	403 191 8709	ELECT 1U M 50V
C2002	403 069 1702	CERAMIC 1000P K 50V
C2003	403 069 5601	CERAMIC 0.01U K 50V
C2004	403 150 6500	ELECT 22U M 16V

LOCATION	PARTS NO.	DESCRIPTION
C2005	403 167 7002	ELECT 4.7U M 50V
C2006	403 068 0409	CERAMIC 0.1U Z 25V
C2007	403 167 7002	ELECT 4.7U M 50V
C2008	403 068 0409	CERAMIC 0.1U Z 25V
C2009	403 159 8109	ELECT 100U M 6.3V
C2010	403 167 6500	ELECT 33U M 6.3V
C2011	403 167 6500	ELECT 33U M 6.3V
C2012	403 068 0409	CERAMIC 0.1U Z 25V
C2013	403 189 2405	ELECT 10U M 16V
C2014	403 068 0409	CERAMIC 0.1U Z 25V
C2016	403 163 8409	ELECT 47U M 16V
C2017	403 074 7607	CERAMIC 5600P K 50V
C2021	403 069 1702	CERAMIC 1000P K 50V
C2022	403 069 1702	CERAMIC 1000P K 50V
C2023	403 075 0706	CERAMIC 6800P K 50V
C2024	403 075 0706	CERAMIC 6800P K 50V
C2025	403 193 7809	ELECT 100U M 16V
C2026	403 081 3302	POLYPRO 0.022U J 100V
C2027	403 068 0409	CERAMIC 0.1U Z 25V
C2051	403 018 0602	CERAMIC 22P J 50V
C2363	403 069 1702	CERAMIC 1000P K 50V
C2365	403 069 1702	CERAMIC 1000P K 50V
C2367	403 069 1702	CERAMIC 1000P K 50V, VHR-268SP,VHR-278SP
C2369	403 069 1702	CERAMIC 1000P K 50V, VHR-268SP,VHR-278SP
C2371	403 134 9602	ELECT 47U M 16V,VHR-268SP,VHR-278SP
C2372	403 074 7607	CERAMIC 5600P K 50V
C2373	403 121 3507	ELECT 4.7U M 50V,VHR-268SP,VHR-278SP
C3001	403 018 0503	CERAMIC 22P J 50V
C3002	403 012 5900	CERAMIC 15P J 50V, VHR-278EX,VHR-278G
C3002	403 014 2501	CERAMIC 18P J 50V, EXCEPT VHR-278EX,VHR-278G
C3004	403 069 5601	CERAMIC 0.01U K 50V
C3005	403 069 5601	CERAMIC 0.01U K 50V
C3008	403 150 6500	ELECT 22U M 16V
C3009	403 069 5601	CERAMIC 0.01U K 50V
C3011	403 068 0409	CERAMIC 0.1U Z 25V
C3012	403 069 5601	CERAMIC 0.01U K 50V
C3014	403 206 9004	ELECT 1000U M 6.3V,VHR-268SP, VHR-248EX,VHR-258EV,VHR-258EV+
C3014	403 135 4101	ELECT 470U M 6.3V, VHR-278SP,VHR-278EX,VHR-278G
C3016	403 069 5601	CERAMIC 0.01U K 50V
C3019	403 068 0409	CERAMIC 0.1U Z 25V
C3022	403 333 1001	DL-ELECT 0.1F Z 5.5V, VHR-278SP,VHR-278EX,VHR-278G
C3034	403 069 5601	CERAMIC 0.01U K 50V
C3037	403 028 3402	CERAMIC 56P J 50V
C3040	403 009 5807	CERAMIC 100P J 50V, VHR-278EX,VHR-278G
C3041	403 009 5807	CERAMIC 100P J 50V, VHR-278EX,VHR-278G
C3042	403 009 5807	CERAMIC 100P J 50V, VHR-278EX,VHR-278G
C3043	403 009 5807	CERAMIC 100P J 50V, VHR-278EX,VHR-278G
C3301	403 107 9905	ELECT 10U M 16V
C3302	403 107 9905	ELECT 10U M 16V
C3303	403 024 7206	CERAMIC 390P J 50V
C3307	403 068 0409	CERAMIC 0.1U Z 25V
C3314	403 189 2405	ELECT 10U M 16V
C3315	403 068 3608	CERAMIC 0.033U Z 25V
C3318	403 011 5000	CERAMIC 120P J 50V
C3320	403 030 7009	CERAMIC 68P J 50V
C3404	403 193 8905	ELECT 22U M 50V
C3501	403 070 9803	CERAMIC 0.015U K 50V
C3502	403 075 0706	CERAMIC 6800P K 50V
C3503	403 070 9803	CERAMIC 0.015U K 50V
C3504	403 228 8207	ELECT 22U M 16V
C3505	403 228 8207	ELECT 22U M 16V
C3506	403 075 0706	CERAMIC 6800P K 50V
C3507	403 150 6500	ELECT 22U M 16V
C3508	403 150 6500	ELECT 22U M 16V
C3509	403 163 7907	ELECT 47U M 6.3V
C3511	403 071 6504	CERAMIC 220P K 50V

LOCATION	PARTS NO.	DESCRIPTION
C3512	403 061 3407	POLYESTER 0.039U J 50V
C3513	403 119 6701	CERAMIC 0.068U K 16V
C3514	403 175 1009	MT-POLYEST 0.15U J 50V
C3515	403 059 6205	POLYESTER 0.022U K 50V
C3516	403 071 8102	CERAMIC 2200P K 50V
C3517	403 070 8806	CERAMIC 1500P K 50V
C3522	403 069 1207	CERAMIC 1000P K 50V
C3523	403 139 2707	ELECT 1U M 50V
C3524	403 069 5601	CERAMIC 0.01U K 50V
C3525	403 139 2608	ELECT 0.47U M 50V
C3526	403 063 7205	POLYESTER 0.082U J 50V
C3536	403 193 7601	ELECT 220U M 6.3V
C3540	403 009 5708	CERAMIC 100P J 50V
C3551	403 175 0903	MT-POLYEST 0.12U J 50V
C3552	403 014 9203	CERAMIC 180P J 50V
C3553	403 191 8709	ELECT 1U M 50V
C3554	403 013 3004	CERAMIC 150P J 50V
C3555	403 069 5601	CERAMIC 0.01U K 50V
C3556	403 069 1702	CERAMIC 1000P K 50V
C3558	403 167 6500	ELECT 33U M 6.3V
C3570	403 070 2606	CERAMIC 0.1U Z 50V
C3571	403 070 2606	CERAMIC 0.1U Z 50V
C5001	⚠ 404 070 4201	MT-POLYEST 0.068U M 250V
C5002	⚠ 404 070 4201	MT-POLYEST 0.068U M 250V
C5005	⚠ 404 074 1602	CERAMIC 1000P M 250V
C5007	⚠ 404 074 1602	CERAMIC 1000P M 250V
C5010	403 249 0204	ELECT 47U M 400V
C5012	403 247 3702	CERAMIC 3300P K 1K
C5013	403 222 1303	CERAMIC 1000P K 1KV
C5014	403 192 5905	CERAMIC 0.1U K 25V
C5015	403 069 5601	CERAMIC 0.01U K 50V
C5016	403 192 5905	CERAMIC 0.1U K 25V
C5101	403 314 0207	ELECT 1000U M 16V
C5102	403 147 9200	ELECT 1000U M 6.3V
C5103	403 314 0108	ELECT 470U M 16V
C5104	403 125 5507	ELECT 1000U M 16V
C5105	403 304 9302	ELECT 47U M 50V
C5106	403 301 1309	ELECT 47U M 35V
C5107	403 301 1507	ELECT 220U M 6.3V
C5108	403 301 1101	ELECT 4.7U M 50V
C5111	403 125 5606	ELECT 100U M 16V
C5112	403 189 2405	ELECT 10U M 16V
C5113	403 189 2405	ELECT 10U M 16V
C5114	403 107 9905	ELECT 10U M 16V
C5115	403 135 7805	ELECT 3.3U M 50V
C5116	403 107 9905	ELECT 10U M 16V
C5117	403 135 7805	ELECT 3.3U M 50V
C5118	403 189 2405	ELECT 10U M 16V
C5119	403 192 5905	CERAMIC 0.1U K 25V
C5120	403 192 5905	CERAMIC 0.1U K 25V
C5122	403 192 5905	CERAMIC 0.1U K 25V
C5123	403 192 5905	CERAMIC 0.1U K 25V
C5135	403 068 0409	CERAMIC 0.1U Z 25V
	(RESISTORS)	
R1001	401 037 5400	MT-GLAZE 1K JA 1/10W
R1002	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R1003	401 037 9200	MT-GLAZE 1.8K JA 1/10W
R1004	401 037 6704	MT-GLAZE 1.2K JA 1/10W
R1005	401 038 6307	MT-GLAZE 470 JA 1/10W
R1006	401 038 6307	MT-GLAZE 470 JA 1/10W
R1011	401 037 5400	MT-GLAZE 1K JA 1/10W
R1012	401 038 6505	MT-GLAZE 47K JA 1/10W
R1014	401 037 9200	MT-GLAZE 1.8K JA 1/10W
R1015	401 039 0403	MT-GLAZE 8.2K JA 1/10W
R1016	401 037 7909	MT-GLAZE 1.5K JA 1/10W
R1017	401 013 6308	CARBON 12K JA 1/4W, EXCEPT VHR-278EX,VHR-278G
R1017	401 016 4707	CARBON 22K JA 1/4W, VHR-278EX,VHR-278G
R1018	401 014 4006	CARBON 1.5K JA 1/4W, EXCEPT VHR-278EX,VHR-278G
R1024	401 037 5400	MT-GLAZE 1K JA 1/10W
R1025	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1028	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R1033	401 018 2701	CARBON 330 JA 1/4W, EXCEPT VHR-268SP,VHR-278SP
R1034	401 038 5003	MT-GLAZE 390 JA 1/10W, EXCEPT VHR-268SP,VHR-278SP

LOCATION	PARTS NO.	DESCRIPTION
R1041	401 038 0701	MT-GLAZE 2.2K JA 1/10W, VHR-278EX,VHR-278G
R1042	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1045	401 037 7008	MT-GLAZE 1.2M JA 1/10W
R1046	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1047	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1048	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1049	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1051	401 012 4404	CARBON 100 JA 1/4W
R1101	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R1102	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R1104	401 015 2605	CARBON 1.8K JA 1/4W
R1301	401 019 0904	CARBON 390 JA 1/4W, EXCEPT VHR-268SP,VHR-278SP
R1301	401 021 1807	CARBON 560 JA 1/4W, VHR-268SP,VHR-278SP
R1303	401 022 6702	CARBON 75 JA 1/4W
R1304	401 037 5004	MT-GLAZE 0.000 ZA 1/10W, EXCEPT VHR-268SP,VHR-278SP
R1309	401 022 1806	CARBON 680 JA 1/4W,V HR-268SP,VHR-278SP
R1310	401 022 1806	CARBON 680 JA 1/4W, VHR-268SP,VHR-278SP
R1311	401 038 4907	MT-GLAZE 39 JA 1/10W, VHR-268SP,VHR-278SP
R1312	401 038 0602	MT-GLAZE 220 JA 1/10W
R1313	401 038 2002	MT-GLAZE 270 JA 1/10W, EXCEPT VHR-268SP, VHR-278SP
R1314	401 038 3405	MT-GLAZE 33 JA 1/10W, VHR-268SP,VHR-278SP
R1341	401 037 5400	MT-GLAZE 1K JA 1/10W, VHR-268SP,VHR-278SP
R1342	401 012 5609	CARBON 1K JA 1/4W, VHR-268SP,VHR-278SP
R1343	401 037 5202	MT-GLAZE 100 JA 1/10W, VHR-268SP,VHR-278SP
R1344	401 037 5202	MT-GLAZE 100 JA 1/10W, VHR-268SP,VHR-278SP
R1345	401 038 6406	MT-GLAZE 4.7K JA 1/10W, VHR-268SP,VHR-278SP
R1346	401 038 6406	MT-GLAZE 4.7K JA 1/10W, VHR-268SP,VHR-278SP
R1347	401 038 6406	MT-GLAZE 4.7K JA 1/10W, VHR-268SP,VHR-278SP
R1348	401 038 6406	MT-GLAZE 4.7K JA 1/10W, VHR-268SP,VHR-278SP
R1349	401 038 3504	MT-GLAZE 330 JA 1/10W, VHR-268SP,VHR-278SP
R1350	401 038 5003	MT-GLAZE 390 JA 1/10W, VHR-268SP,VHR-278SP
R1351	401 037 5004	MT-GLAZE 0.000 ZA 1/10W, VHR-268SP,VHR-278SP
R1352	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1404	401 038 3603	MT-GLAZE 3.3K JA 1/10W, VHR-278EX,VHR-278G
R1405	401 038 0602	MT-GLAZE 220 JA 1/10W, VHR-278EX,VHR-278G
R1408	401 038 2002	MT-GLAZE 270 JA 1/10W, VHR-268SP,VHR-278SP
R1409	401 037 5004	MT-GLAZE 0.000 ZA 1/10W, EXCEPT VHR-278EX,VHR-278G
R1410	401 037 5004	MT-GLAZE 0.000 ZA 1/10W, EXCEPT VHR-268SP,VHR-278SP
R1410	401 037 6605	MT-GLAZE 120 JA 1/10W, VHR-268SP,VHR-278SP
R1417	401 039 0403	MT-GLAZE 8.2K JA 1/10W, VHR-278EX,VHR-278G
R1419	401 037 5806	MT-GLAZE 1M JA 1/10W, VHR-278EX,VHR-278G
R2001	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R2002	401 037 6803	MT-GLAZE 12K JA 1/10W
R2003	401 037 6803	MT-GLAZE 12K JA 1/10W
R2004	401 038 3801	MT-GLAZE 330K JA 1/10W
R2005	401 037 7206	MT-GLAZE 130 JA 1/10W
R2006	401 038 3603	MT-GLAZE 3.3K JA 1/10W
R2007	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R2008	401 039 0403	MT-GLAZE 8.2K JA 1/10W
R2009	401 038 3900	MT-GLAZE 3.3M JA 1/10W

LOCATION	PARTS NO.	DESCRIPTION
R2010	401 038 3702	MT-GLAZE 33K JA 1/10W
R2011	401 037 5608	MT-GLAZE 10K JA 1/10W
R2012	401 039 0403	MT-GLAZE 8.2K JA 1/10W
R2013	401 038 3702	MT-GLAZE 33K JA 1/10W
R2017	401 037 5608	MT-GLAZE 10K JA 1/10W
R2021	401 038 2200	MT-GLAZE 27K JA 1/10W
R2022	401 037 9200	MT-GLAZE 1.8K JA 1/10W
R2023	401 037 5400	MT-GLAZE 1K JA 1/10W
R2024	401 038 6208	MT-GLAZE 47 JA 1/10W
R2025	401 011 8809	CARBON 1 JA 1/4W
R2026	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R2027	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R2028	401 037 9101	MT-GLAZE 180 JA 1/10W
R2029	401 037 5608	MT-GLAZE 10K JA 1/10W
R2030	401 038 0800	MT-GLAZE 22K JA 1/10W
R2031	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R2331	401 037 6704	MT-GLAZE 1.2K JA 1/10W
R2332	401 038 2101	MT-GLAZE 2.7K JA 1/10W
R2340	401 018 2701	CARBON 330 JA 1/4W
R2341	401 021 2903	CARBON 5.6K JA 1/4W
R2342	401 021 2903	CARBON 5.6K JA 1/4W
R2343	401 012 4404	CARBON 100 JA 1/4W
R2344	401 012 6903	CARBON 10K JA 1/4W
R2345	401 012 6903	CARBON 10K JA 1/4W
R2347	401 020 1907	CARBON 4.7K JA 1/4W
R2363	401 038 7601	MT-GLAZE 560 JA 1/10W
R2365	401 038 2101	MT-GLAZE 2.7K JA 1/10W
R2366	401 038 2101	MT-GLAZE 2.7K JA 1/10W
R2367	401 038 7601	MT-GLAZE 560 JA 1/10W, VHR-268SP,VHR-278SP
R2369	401 038 2101	MT-GLAZE 2.7K JA 1/10W, VHR-268SP,VHR-278SP
R2370	401 038 2101	MT-GLAZE 2.7K JA 1/10W, VHR-268SP,VHR-278SP
R2371	401 013 6308	CARBON 12K JA 1/4W, VHR-268SP,VHR-278SP
R2372	401 023 2703	CARBON 8.2K JA 1/4W, VHR-268SP,VHR-278SP
R2373	401 039 0403	MT-GLAZE 8.2K JA 1/10W, VHR-268SP,VHR-278SP
R2374	401 012 5609	CARBON 1K JA 1/4W, VHR-268SP,VHR-278SP
R2376	401 037 5400	MT-GLAZE 1K JA 1/10W, VHR-268SP,VHR-278SP
R2377	401 037 5400	MT-GLAZE 1K JA 1/10W, VHR-268SP,VHR-278SP
R2378	401 037 5400	MT-GLAZE 1K JA 1/10W, VHR-268SP,VHR-278SP
R2380	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R2381	401 037 5400	MT-GLAZE 1K JA 1/10W
R2382	401 037 5608	MT-GLAZE 10K JA 1/10W, VHR-268SP,VHR-278SP
R2383	401 038 2101	MT-GLAZE 2.7K JA 1/10W, VHR-268SP,VHR-278SP
R2384	401 037 5202	MT-GLAZE 100 JA 1/10W, VHR-268SP,VHR-278SP
R2385	401 037 5202	MT-GLAZE 100 JA 1/10W, VHR-268SP,VHR-278SP
R2386	401 037 5202	MT-GLAZE 100 JA 1/10W, VHR-268SP,VHR-278SP
R2387	401 037 5202	MT-GLAZE 100 JA 1/10W, VHR-268SP,VHR-278SP
R2391	401 038 9506	MT-GLAZE 75 JA 1/10W, VHR-268SP,VHR-278SP
R2392	401 038 9506	MT-GLAZE 75 JA 1/10W, VHR-268SP,VHR-278SP
R2393	401 038 6406	MT-GLAZE 4.7K JA 1/10W, VHR-268SP,VHR-278SP
R2394	401 038 0701	MT-GLAZE 2.2K JA 1/10W, VHR-268SP,VHR-278SP
R2396	401 038 9506	MT-GLAZE 75 JA 1/10W, EXCEPT VHR-268SP,VHR-278SP
R3001	⚠402 067 7402	FUSIBLE RES 3.3 JA 1/2W
R3004	401 037 7909	MT-GLAZE 1.5K JA 1/10W
R3007	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R3008	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R3009	401 023 1607	CARBON 820 JA 1/4W
R3011	401 020 2805	CARBON 47K JA 1/4W

LOCATION	PARTS NO.	DESCRIPTION
R3013	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R3014	401 014 9001	CARBON 16K JA 1/4W
R3015	401 014 9001	CARBON 16K JA 1/4W
R3017	401 038 9209	MT-GLAZE 6.8K JA 1/10W
R3019	401 038 2200	MT-GLAZE 27K JA 1/10W
R3023	401 037 5400	MT-GLAZE 1K JA 1/10W
R3024	401 037 5400	MT-GLAZE 1K JA 1/10W
R3025	401 037 5400	MT-GLAZE 1K JA 1/10W
R3026	401 037 5400	MT-GLAZE 1K JA 1/10W
R3032	401 018 4804	CARBON 33K JA 1/4W
R3036	401 016 3700	CARBON 2.2K JA 1/4W
R3037	401 038 5300	MT-GLAZE 39K JA 1/10W
R3047	401 037 9200	MT-GLAZE 1.8K JA 1/10W
R3048	401 037 6704	MT-GLAZE 1.2K JA 1/10W
R3049	401 038 2101	MT-GLAZE 2.7K JA 1/10W
R3050	401 016 4707	CARBON 22K JA 1/4W
R3051	401 016 4707	CARBON 22K JA 1/4W
R3059	401 012 6903	CARBON 10K JA 1/4W
R3090	401 016 2505	CARBON 220 JA 1/4W, EXCEPT VHR-268SP,VHR-278SP
R3091	401 016 2505	CARBON 220 JA 1/4W, EXCEPT VHR-268SP,VHR-278SP
R3092	401 016 2505	CARBON 220 JA 1/4W, EXCEPT VHR-268SP, VHR-278SP
R3094	401 013 5202	CARBON 1.2K JA 1/4W, EXCEPT VHR-268SP,VHR-278SP
R3095	401 013 5202	CARBON 1.2K JA 1/4W, EXCEPT VHR-268SP,VHR-278SP
R3101	401 012 6903	CARBON 10K JA 1/4W
R3102	401 012 6903	CARBON 10K JA 1/4W
R3103	401 012 6903	CARBON 10K JA 1/4W
R3104	401 012 6903	CARBON 10K JA 1/4W
R3301	401 038 5003	MT-GLAZE 390 JA 1/10W
R3302	401 037 7909	MT-GLAZE 1.5K JA 1/10W
R3305	401 038 3603	MT-GLAZE 3.3K JA 1/10W
R3306	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R3309	⚠402 078 2908	FUSIBLE RES 680 GA 1/4W
R3501	401 012 8006	CARBON 100K JA 1/4W
R3502	401 037 5707	MT-GLAZE 100K JA 1/10W
R3503	401 038 3801	MT-GLAZE 330K JA 1/10W
R3504	401 014 6000	CARBON 150K JA 1/4W
R3505	401 014 5102	CARBON 15K JA 1/4W
R3506	401 038 0909	MT-GLAZE 220K JA 1/10W
R3507	401 014 6000	CARBON 150K JA 1/4W
R3508	401 017 2702	CARBON 27K JA 1/4W
R3516	401 039 0403	MT-GLAZE 8.2K JA 1/10W
R3517	401 038 6505	MT-GLAZE 47K JA 1/10W
R3518	401 020 2805	CARBON 47K JA 1/4W
R3520	401 038 5409	MT-GLAZE 390K JA 1/10W
R3521	401 037 5608	MT-GLAZE 10K JA 1/10W
R3525	401 012 5609	CARBON 1K JA 1/4W
R3526	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R3527	401 037 5400	MT-GLAZE 1K JA 1/10W
R3528	401 020 7800	CARBON 510 JA 1/4W
R3529	401 020 7800	CARBON 510 JA 1/4W
R3537	401 039 0403	MT-GLAZE 8.2K JA 1/10W
R3546	401 020 1907	CARBON 4.7K JA 1/4W
R3547	401 037 8005	MT-GLAZE 15K JA 1/10W
R3549	401 037 5608	MT-GLAZE 10K JA 1/10W
R3550	401 039 0403	MT-GLAZE 8.2K JA 1/10W
R3556	401 037 5608	MT-GLAZE 10K JA 1/10W
R3557	401 037 9408	MT-GLAZE 180K JA 1/10W
R3558	401 038 6307	MT-GLAZE 470 JA 1/10W
R3560	401 037 5400	MT-GLAZE 1K JA 1/10W
R5001	402 013 9108	SOLID 2.7M KB 1/2W
R5002	401 021 4907	CARBON 560K JA 1/4W
R5003	401 021 4907	CARBON 560K JA 1/4W
R5011	401 015 0403	CARBON 18 JA 1/4W
R5012	401 064 7309	OXIDE-MT 100 JA 2W
R5013	401 037 5400	MT-GLAZE 1K JA 1/10W
R5014	401 037 5400	MT-GLAZE 1K JA 1/10W
R5015	401 037 6704	MT-GLAZE 1.2K JA 1/10W
R5016	401 038 9001	MT-GLAZE 680 JA 1/10W
R5017	401 038 2101	MT-GLAZE 2.7K JA 1/10W
R5101	401 038 5003	MT-GLAZE 390 JA 1/10W
R5102	401 037 7800	MT-GLAZE 150 JA 1/10W
R5103	401 038 7601	MT-GLAZE 560 JA 1/10W
R5104	401 012 6903	CARBON 10K JA 1/4W

LOCATION	PARTS NO.	DESCRIPTION
R5105	401 016 2505	CARBON 220 JA 1/4W
R5106	401 020 0702	CARBON 470 JA 1/4W
R5108	401 037 9200	MT-GLAZE 1.8K JA 1/10W
R5109	401 038 3603	MT-GLAZE 3.3K JA 1/10W
R5110	⚠ 402 071 3100	FUSIBLE RES 27 JA 1/4W
R5111	401 038 7601	MT-GLAZE 560 JA 1/10W
R5115	401 038 2101	MT-GLAZE 2.7K JA 1/10W
R5116	401 038 2101	MT-GLAZE 2.7K JA 1/10W
R5117	401 037 6605	MT-GLAZE 120 JA 1/10W
R5118	401 037 6605	MT-GLAZE 120 JA 1/10W
R5119	401 038 6505	MT-GLAZE 47K JA 1/10W
R5120	⚠ 402 004 0107	FUSIBLE RES 10 JA 1/4W
R5121	401 017 7509	CARBON 3.9 JA 1/4W
R5122	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R5123	401 039 0304	MT-GLAZE 820 JA 1/10W
R5124	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R5125	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R5131	401 014 4006	CARBON 1.5K JA 1/4W
R5132	401 038 4105	MT-GLAZE 3.6K JA 1/10W
R5133	401 039 0403	MT-GLAZE 8.2K JA 1/10W
R5134	401 014 4006	CARBON 1.5K JA 1/4W
R5135	401 037 6605	MT-GLAZE 120 JA 1/10W
	(JUMPERS)	
	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
	(FUSES)	
F5001	⚠ 423 025 9900	FUSE 250V 2.5A
OR	⚠ 423 022 6506	FUSE 250V 2.5A
OR	⚠ 423 021 8402	FUSE 250V 2.5A
	(PROTECTORS)	
PR510	⚠ 645 005 9834	PROTECTOR,IC 1.0A 50V
PR511	⚠ 645 005 9834	PROTECTOR,IC 1.0A 50V
PR512	⚠ 645 014 2529	PROTECTOR,1.25A 125V
	(MISCELLANEOUS)	
	613 053 8048	FIXER
	645 008 7660	HOLDER,FUSE,F5001
OR	645 016 0479	HOLDER,FUSE,F5001
OR	645 008 7677	HOLDER,FUSE,F5001

COMPL PWB,VP-1

613 179 3088

	(CONNECTORS)	
CN182	645 005 4136	SOCKET,5P (N.S.P)
OR	645 009 4095	SOCKET,FFC 5P (N.S.P)
	(INTEGRATED CIRCUITS)	
IC181	409 391 5104	IC LA70001L
	(CAPACITORS)	
C1805	403 068 0409	CERAMIC 0.1U Z 25V
C1806	403 069 5601	CERAMIC 0.01U K 50V
C1807	403 163 7907	ELECT 47U M 6.3V
C1808	403 068 0409	CERAMIC 0.1U Z 25V
C1809	403 191 8709	ELECT 1U M 50V
C1810	403 069 5601	CERAMIC 0.01U K 50V
C1835	403 069 5601	CERAMIC 0.01U K 50V
C1836	403 072 1607	CERAMIC 0.022U K 50V
	(RESISTORS)	
R1801	401 037 8005	MT-GLAZE 15K JA 1/10W
R1802	401 037 6704	MT-GLAZE 1.2K JA 1/10W
R1804	401 038 9001	MT-GLAZE 680 JA 1/10W
R1806	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R1807	401 037 5400	MT-GLAZE 1K JA 1/10W
R1831	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1833	401 037 5004	MT-GLAZE 0.000 ZA 1/10W

COMPL PWB,TM-1

613 180 5972	VHR-248EX,VHR-278G
613 179 3002	VHR-268SP,VHR-278SP, VHR-258EV,VHR-258EV+
613 178 9944	VHR-278EX ONLY

	(CONNECTORS)	
CN711	645 005 4761	SOCKET,31P (N.S.P), EXCEPT VHR-278EX
CN711	645 009 4361	SOCKET,FFC 31P (N.S.P),EXCEPT VHR-278EX
CN714	645 005 4761	SOCKET,31P (N.S.P),VHR-278EX ONLY
OR	645 009 4361	SOCKET,FFC 31P (N.S.P),VHR-278EX ONLY
	(DIODES)	
D7101	407 012 4406	DIODE 1SS133
D7102	407 012 4406	DIODE 1SS133
D7103	407 012 4406	DIODE 1SS133
D7104	407 012 4406	DIODE 1SS133
D7123	407 163 3501	LED SEL2715Y-C, POWER SAVE LED, EXCEPT VHR-278EX
OR	407 163 3600	LED SEL2715Y-D, POWER SAVE LED, EXCEPT VHR-278EX
	(CAPACITORS)	
C7101	403 043 8802	ELECT 4.7U M 16V,EXCEPT VHR-278EX
C7101	403 167 7002	ELECT 4.7U M 50V,VHR-278EX ONLY
	(RESISTORS)	
R7105	401 013 4106	CARBON 120 JA 1/4W, EXCEPT VHR-278EX
	(SWITCHES)	
S7101	645 006 2797	SWITCH,PUSH 1P-1T, POWER, EXCEPT VHR-278EX
OR	645 008 8049	SWITCH,PUSH 1P-1T, POWER, EXCEPT VHR-278EX
OR	645 001 9777	SWITCH,PUSH 1P-1T, POWER, EXCEPT VHR-278EX
OR	645 011 5172	SWITCH,PUSH 1P-1T, POWER, EXCEPT VHR-278EX
OR	645 011 5165	SWITCH,PUSH 1P-1T, POWER, EXCEPT VHR-278EX
S7102	645 008 8049	SWITCH,PUSH 1P-1T, STOP/EJECT, EXCEPT VHR-278EX
OR	645 001 9777	SWITCH,PUSH 1P-1T, STOP/EJECT, EXCEPT VHR-278EX
OR	645 011 5172	SWITCH,PUSH 1P-1T, STOP/EJECT, EXCEPT VHR-278EX
OR	645 011 5165	SWITCH,PUSH 1P-1T, STOP/EJECT, EXCEPT VHR-278EX
OR	645 006 2797	SWITCH,PUSH 1P-1T, STOP/EJECT, EXCEPT VHR-278EX
S7103	645 001 9777	SWITCH,PUSH 1P-1T, CH-UP,VHR-278EX ONLY
OR	645 008 8049	SWITCH,PUSH 1P-1T, CH-UP,VHR-278EX ONLY
OR	645 006 2797	SWITCH,PUSH 1P-1T, CH-UP,VHR-278EX ONLY
S7103	645 001 9777	SWITCH,PUSH 1P-1T, CH-UP, EXCEPT VHR-278EX
OR	645 011 5172	SWITCH,PUSH 1P-1T, CH-UP, EXCEPT VHR-278EX
OR	645 011 5165	SWITCH,PUSH 1P-1T, CH-UP, EXCEPT VHR-278EX
OR	645 006 2797	SWITCH,PUSH 1P-1T, CH-UP, EXCEPT VHR-278EX
OR	645 008 8049	SWITCH,PUSH 1P-1T, CH-UP, EXCEPT VHR-278EX
S7104	645 001 9777	SWITCH,PUSH 1P-1T, CH-DOWN, VHR-278EX ONLY
OR	645 006 2797	SWITCH,PUSH 1P-1T, CH-DOWN, VHR-278EX ONLY
OR	645 008 8049	SWITCH,PUSH 1P-1T, CH-DOWN, VHR-278EX ONLY
S7104	645 001 9777	SWITCH,PUSH 1P-1T, CH-DOWN, EXCEPT VHR-278EX
OR	645 011 5172	SWITCH,PUSH 1P-1T, CH-DOWN, EXCEPT VHR-278EX
OR	645 008 8049	SWITCH,PUSH 1P-1T, CH-DOWN, EXCEPT VHR-278EX
OR	645 011 5165	SWITCH,PUSH 1P-1T, CH-DOWN, EXCEPT VHR-278EX
OR	645 006 2797	SWITCH,PUSH 1P-1T, CH-DOWN, EXCEPT VHR-278EX
S7105	645 001 9777	SWITCH,PUSH 1P-1T, REC,VHR-278EX ONLY
OR	645 006 2797	SWITCH,PUSH 1P-1T, REC,VHR-278EX ONLY
OR	645 008 8049	SWITCH,PUSH 1P-1T, REC,VHR-278EX ONLY
S7106	645 008 8049	SWITCH,PUSH 1P-1T, PAUSE, EXCEPT VHR-278EX
OR	645 011 5172	SWITCH,PUSH 1P-1T, PAUSE, EXCEPT VHR-278EX
OR	645 006 2797	SWITCH,PUSH 1P-1T, PAUSE, EXCEPT VHR-278EX

LOCATION	PARTS NO.	DESCRIPTION
S7106	645 011 5165	SWITCH,PUSH 1P-1T, PAUSE, EXCEPT VHR-278EX
OR	645 001 9777	SWITCH,PUSH 1P-1T, PAUSE, EXCEPT VHR-278EX
S7106	645 006 2797	SWITCH,PUSH 1P-1T, PAUSE,VHR-278EX ONLY
OR	645 008 8049	SWITCH,PUSH 1P-1T, PAUSE,VHR-278EX ONLY
OR	645 001 9777	SWITCH,PUSH 1P-1T, PAUSE,VHR-278EX ONLY
S7107	645 006 2797	SWITCH,PUSH 1P-1T, REW,EXCEPT VHR-278EX
OR	645 008 8049	SWITCH,PUSH 1P-1T, REW,EXCEPT VHR-278EX
OR	645 001 9777	SWITCH,PUSH 1P-1T, REW,EXCEPT VHR-278EX
OR	645 011 5172	SWITCH,PUSH 1P-1T, REW,EXCEPT VHR-278EX
OR	645 011 5165	SWITCH,PUSH 1P-1T, REW,EXCEPT VHR-278EX
S7108	645 008 8049	SWITCH,PUSH 1P-1T, PLAY, EXCEPT VHR-278EX
OR	645 011 5172	SWITCH,PUSH 1P-1T, PLAY, EXCEPT VHR-278EX
OR	645 001 9777	SWITCH,PUSH 1P-1T, PLAY, EXCEPT VHR-278EX
OR	645 011 5165	SWITCH,PUSH 1P-1T, PLAY, EXCEPT VHR-278EX
OR	645 006 2797	SWITCH,PUSH 1P-1T, PLAY, EXCEPT VHR-278EX
S7108	645 001 9777	SWITCH,PUSH 1P-1T, FF,VHR-278EX ONLY
OR	645 006 2797	SWITCH,PUSH 1P-1T, FF,VHR-278EX ONLY
OR	645 008 8049	SWITCH,PUSH 1P-1T, FF,VHR-278EX ONLY
S7109	645 008 8049	SWITCH,PUSH 1P-1T, FF,EXCEPT VHR-278EX
OR	645 001 9777	SWITCH,PUSH 1P-1T, FF,EXCEPT VHR-278EX
OR	645 011 5172	SWITCH,PUSH 1P-1T, FF,EXCEPT VHR-278EX
OR	645 011 5165	SWITCH,PUSH 1P-1T, FF,EXCEPT VHR-278EX
OR	645 006 2797	SWITCH,PUSH 1P-1T, FF,EXCEPT VHR-278EX
S7109	645 001 9777	SWITCH,PUSH 1P-1T, REW,VHR-278EX ONLY
OR	645 006 2797	SWITCH,PUSH 1P-1T, REW,VHR-278EX ONLY
OR	645 008 8049	SWITCH,PUSH 1P-1T, REW,VHR-278EX ONLY
S7110	645 008 8049	SWITCH,PUSH 1P-1T, REC,EXCEPT VHR-278EX
OR	645 001 9777	SWITCH,PUSH 1P-1T, REC,EXCEPT VHR-278EX
OR	645 011 5172	SWITCH,PUSH 1P-1T, REC,EXCEPT VHR-278EX
OR	645 011 5165	SWITCH,PUSH 1P-1T, REC,EXCEPT VHR-278EX
OR	645 006 2797	SWITCH,PUSH 1P-1T, REC,EXCEPT VHR-278EX
S7110	645 008 8049	SWITCH,PUSH 1P-1T, STOP/EJECT, VHR-278EX ONLY
OR	645 001 9777	SWITCH,PUSH 1P-1T, STOP/EJECT, VHR-278EX ONLY
OR	645 006 2797	SWITCH,PUSH 1P-1T, STOP/EJECT, VHR-278EX ONLY
S7111	645 008 8049	SWITCH,PUSH 1P-1T, PLAY,VHR-278EX ONLY
OR	645 001 9777	SWITCH,PUSH 1P-1T, PLAY,VHR-278EX ONLY
OR	645 006 2797	SWITCH,PUSH 1P-1T, PLAY,VHR-278EX ONLY
	(DISPLAYS)	
A7101	645 020 9437	FLUORESCENT TUBE
OR	645 004 0597	FLUORESCENT TUBE
	(REMOTE RECEIVERS)	
RR711	645 021 5384	UNIT,IR RECEIVER PACK (A)
OR	645 027 2332	UNIT,IR RECEIVER PACK (B)

Take note that (A) and (B) parts have no interchangebility.
UNIT,IR RECEIVER PACK (A) (645 021 5384) should only be used with HOLDER IR, RR711(A) (613 163 1700).
Likewise, UNIT,IR RECEIVER PACK (B) (645 027 2332) should only be used with HOLDER,IR,RR711 (B) (613 173 7488).

	(MISCELLANEOUS)	
	613 142 4913	HOLDER LED, LED,EXCEPT VHR-278EX
	613 163 1700	HOLDER IR, RR711(A)
OR	613 173 7488	HOLDER,IR,RR711(B)
	613 139 2267	HOLDER FL

COMPL PWB,TM-2

	613 178 9951	VHR-278EX ONLY
	(CONNECTORS)	
CN721	645 003 1663	SOCKET,RIBBON 4P (N.S.P),VHR-278EX ONLY
	(DIODES)	
D7204	408 035 5203	LED SEL2413EM-TP2-D,VHR-278EX ONLY
	(RESISTORS)	
R7209	401 013 4106	CARBON 120 JA 1/4W,VHR-278EX ONLY

LOCATION	PARTS NO.	DESCRIPTION
	(SWITCHES)	
S7201	645 006 2797	SWITCH,PUSH 1P-1T,VHR-278EX ONLY
OR	645 008 8049	SWITCH,PUSH 1P-1T,VHR-278EX ONLY
OR	645 001 9777	SWITCH,PUSH 1P-1T,VHR-278EX ONLY

COMPL PCB,TM-9

	613 179 1091	Built in : VHR-278EX,VHR-278G Opiton : EXCEPT VHR-278EX,VHR-278G
	(CONNECTORS)	
CN771	645 003 0840	PLUG,5P (N.S.P)
OR	613 113 3853	CONNECTOR,5P (N.S.P.)
	(INTEGRATED CIRCUITS)	
IC771	409 380 8604	IC SDA5650
	(CAPACITORS)	
C7701	403 060 7505	POLYESTER 0.033U J 50V
C7702	403 071 8102	CERAMIC 2200P K 50V
C7703	403 256 4608	MT-COMPO 0.33U J 50V
C7704	403 013 3004	CERAMIC 150P J 50V
C7705	403 068 0409	CERAMIC 0.1U Z 25V
C7706	403 129 0409	CERAMIC 0.01U K 16V
	(RESISTORS)	
R7701	401 038 9209	MT-GLAZE 6.8K JA 1/10W
R7702	401 037 7008	MT-GLAZE 1.2M JA 1/10W
R7703	401 038 9209	MT-GLAZE 6.8K JA 1/10W
R7704	401 037 7008	MT-GLAZE 1.2M JA 1/10W
R7705	401 037 5806	MT-GLAZE 1M JA 1/10W
R7706	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R7707	401 037 5707	MT-GLAZE 100K JA 1/10W
R7708	401 037 5608	MT-GLAZE 10K JA 1/10W

FLEXIBLE FLAT CABLE

	645 017 0645	FLEXIBLE FLAT CABLE(CN301-S711)

COMPL PWB,MC-1

	613 173 9451	
	(CONNECTORS)	
CN801	645 007 8446	SOCKET,12P (N.S.P)
C8001	403 121 9509	CERAMIC 0.1U Z 50V
	(RESISTORS)	
R8001	401 015 2605	CARBON 1.8K JA 1/4W
R8002	401 023 1607	CARBON 820 JA 1/4W
R8003	401 017 0708	CARBON 270 JA 1/4W
R8004	401 014 2804	CARBON 150 JA 1/4W
	(SWITCHES)	
S8002	645 003 4589	SWITCH,DETECTOR 1P-1T,
OR	645 009 3388	SWITCH,DETECTOR 1P-1T,
	(MISCELLANEOUS)	
	613 152 4002	SPACER,MC1

ACCESSORIES

645 027 5890	REMOCON,INFRARED, WITH COVER BATTERY,VHR-278SP ONLY
645 027 0895	REMOCON,INFRARED VHR-278E, WITH COVER BATTERY, VHR-278EX,VHR-278G
645 026 7994	REMOCON,INFRARED VHR-268S, WITH COVER BATTERY,VHR-268SP, VHR-248EX,VHR-258EV,VHR-258EV+
613 179 2531	COVER BATTERY,FOR REMOCON,INFRARED
613 180 1998	INSTRUCTION MANUAL,VHR-278SP ONLY
613 179 3200	INSTRUCTION MANUAL,VHR-268SP ONLY
613 179 8984	INSTRUCTION MANUAL,VHR-248EX ONLY
613 180 5903	INSTRUCTION MANUAL,VHR-278G ONLY
613 180 5385	INSTRUCTION MANUAL,VHR-258EV ONLY
613 182 9213	INSTRUCTION MANUAL,VHR-258EV+ ONLY
613 179 4016	INSTRUCTION MANUAL,VHR-278EX ONLY
613 182 9404	INSTRUCTION MANUAL,VHR-278G ONLY

LOCATION	PARTS NO.	DESCRIPTION
	645 023 4170	CABLE,ANT PAL
OR	645 025 1382	CABLE,ANT PAL
	⚠645 028 3086	CORD,POWER
OR	⚠645 025 0767	CORD,POWER
OR	⚠645 023 4163	CORD,POWER
OR	⚠645 024 0522	CORD,POWER

PACKING MATERIALS

613 180 5552	CARTON CASE,VHR-278G ONLY
613 180 5316	CARTON CASE,VHR-258EV ONLY
613 182 8865	CARTON CASE,VHR-258EV+ ONLY
613 179 4108	CARTON CASE,VHR-278EX ONLY
613 179 8960	CARTON CASE,VHR-248EX ONLY
613 180 1950	CARTON CASE,VHR-278SP ONLY
613 179 3187	CARTON CASE,VHR-268SP ONLY
613 173 2537	CUSHION, FRONT(SID)
613 173 2544	CUSHION, BACK(SID)
613 139 8047	POLYE COVER,INNER-K

SANYO Electric Co.,Ltd.
Osaka, Japan

Mar./'98 / 2000 NS Printed in Japan

VHR-248EX,VHR-258EV,VHR-258EV+
VHR-278EX,VHR-278G,VHR-268SP
VHR-278SP

BLOCK DIAGRAMS,CIRCUIT DIAGRAMS & PRINTED WIRING BOARDS

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REFERENCE No.SM531633

NOTES:

1. All resistance values in "OHMS" unless otherwise noted.
   (K=1,000; M=1,000,000)
2. All capacitance values in "μF" unless otherwise noted.
   p=pico farad ; μ,u or U=micro farad
3. All inductance values in "μH" unless otherwise noted.
   μ,u or U=micro henry ; m=milli henry

PRODUCTSAFETYNOTICE

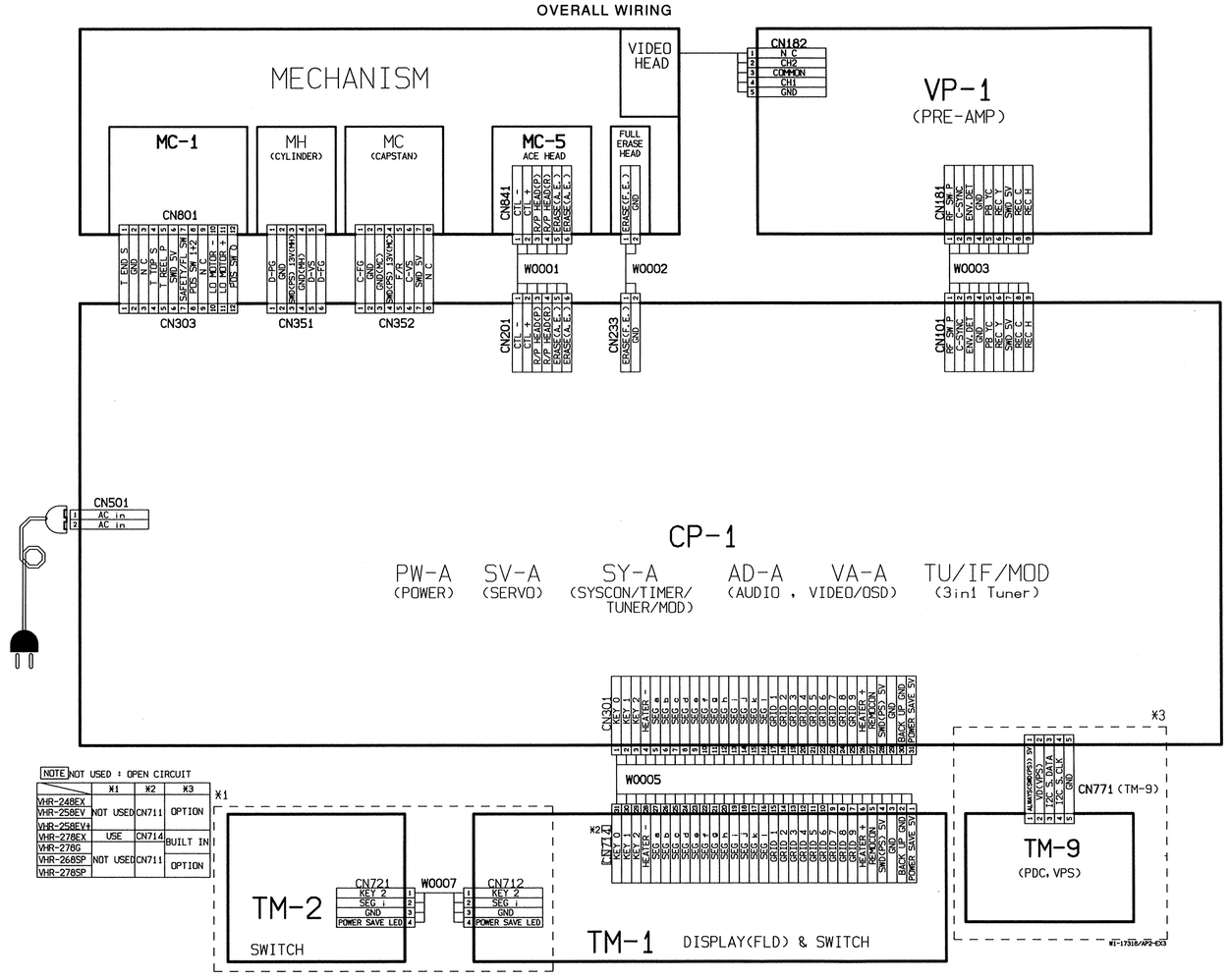
THE COMPONENTS DESIGNATED BY A SYMBOL (⚠) IN THIS SCHEMATIC DIAGRAM DESIGNATES COMPONENTS WHOSE VALUE ARE OF SPECIAL SIGNIFICANCE TO PRODUCT SAFETY. SHOULD ANY COMPONENT DESIGNATED BY A SYMBOL NEED TO BE REPLACED, USE ONLY THE PART DESIGNATED IN THE PARTS LIST.
DO NOT DEVIATE FROM THE RESISTANCE, WATTAGE AND VOLTAGE RATINGS SHOWN.

EXPLANATORY NOTES (EXAMPLES)

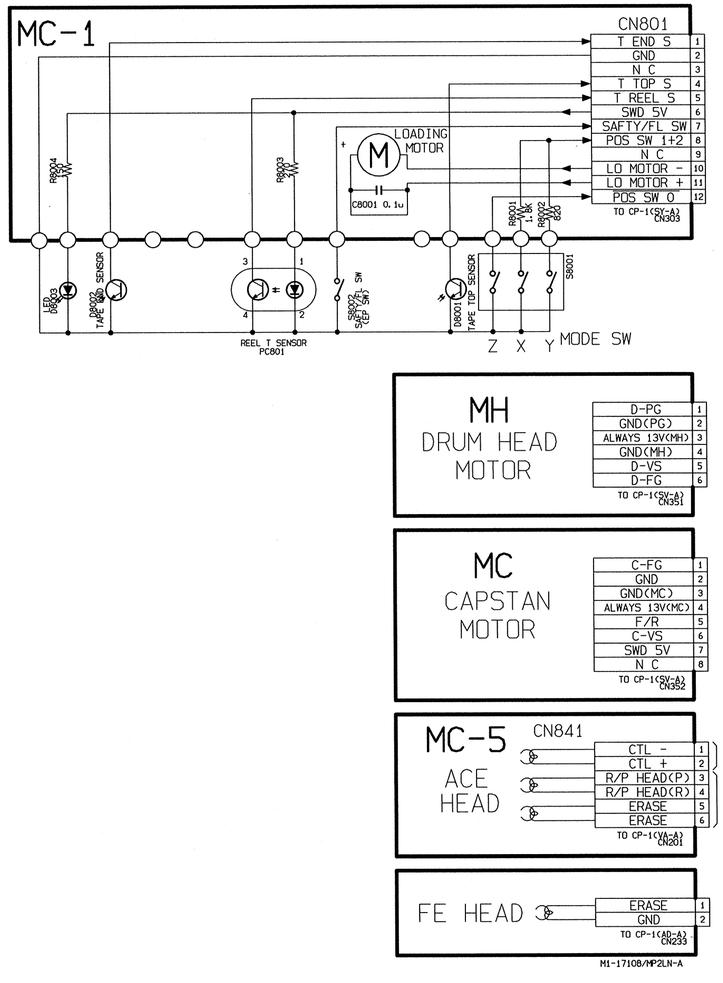
Resistor	10K:1/16J means 10kilo ohm ±5%, 1/16watt max.
	1M:1/10K means 1mega ohm ±10%, 1/10watt max.
Capacitor	0.047:F means 0.047micro farad, Ftype.
Electrolytic capacitor	
	10:16 means 10micro farad, 16volt max.
Inductor	330:J means 330micro henry ±5%
	470:K means 470micro henry ±10%
	No description J or K means ±5%

1. OVERALL WIRING,MECHANISM CONNECTION & BLOCK DIAGRAMS

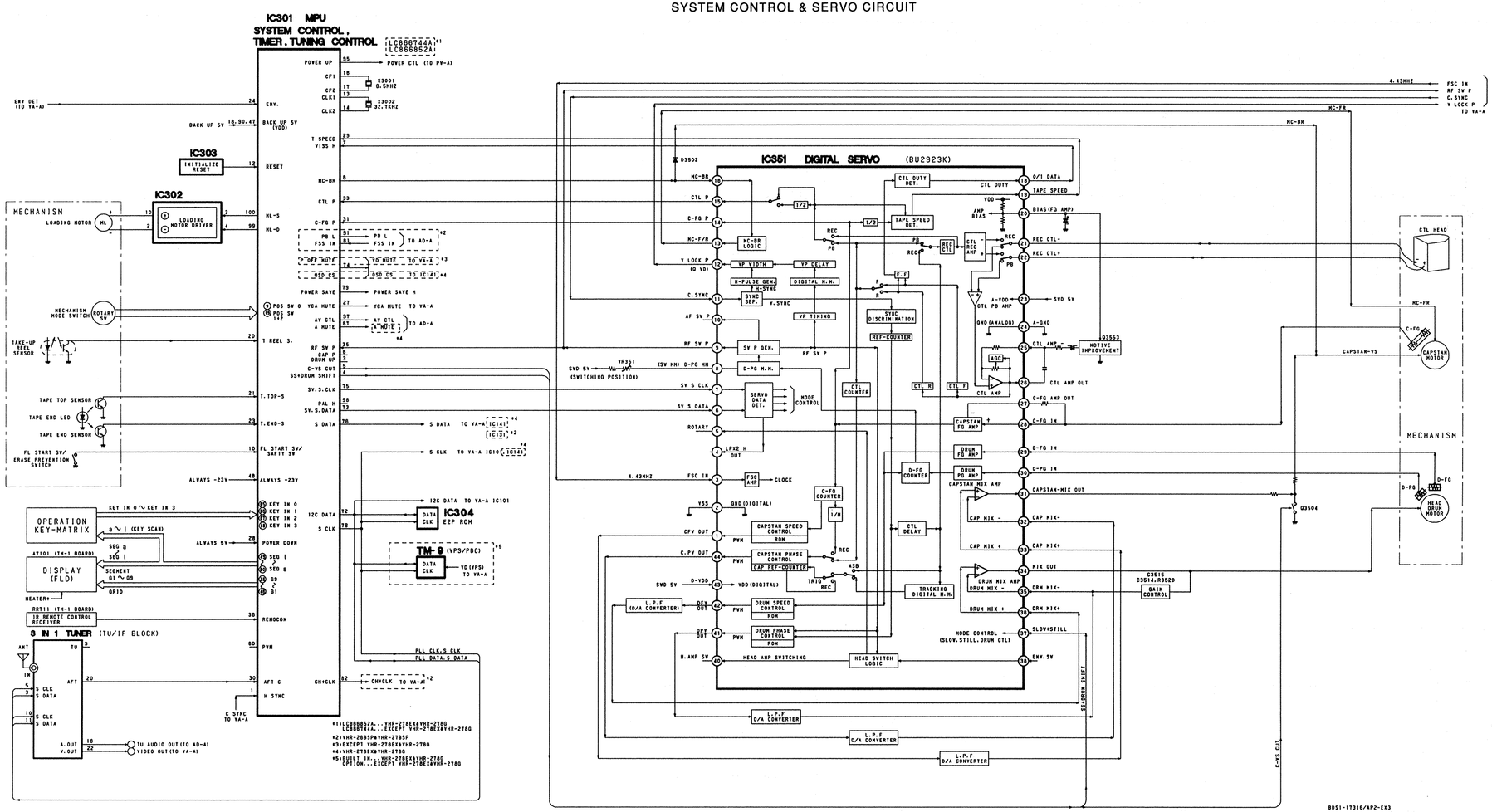
OVERALL WIRING



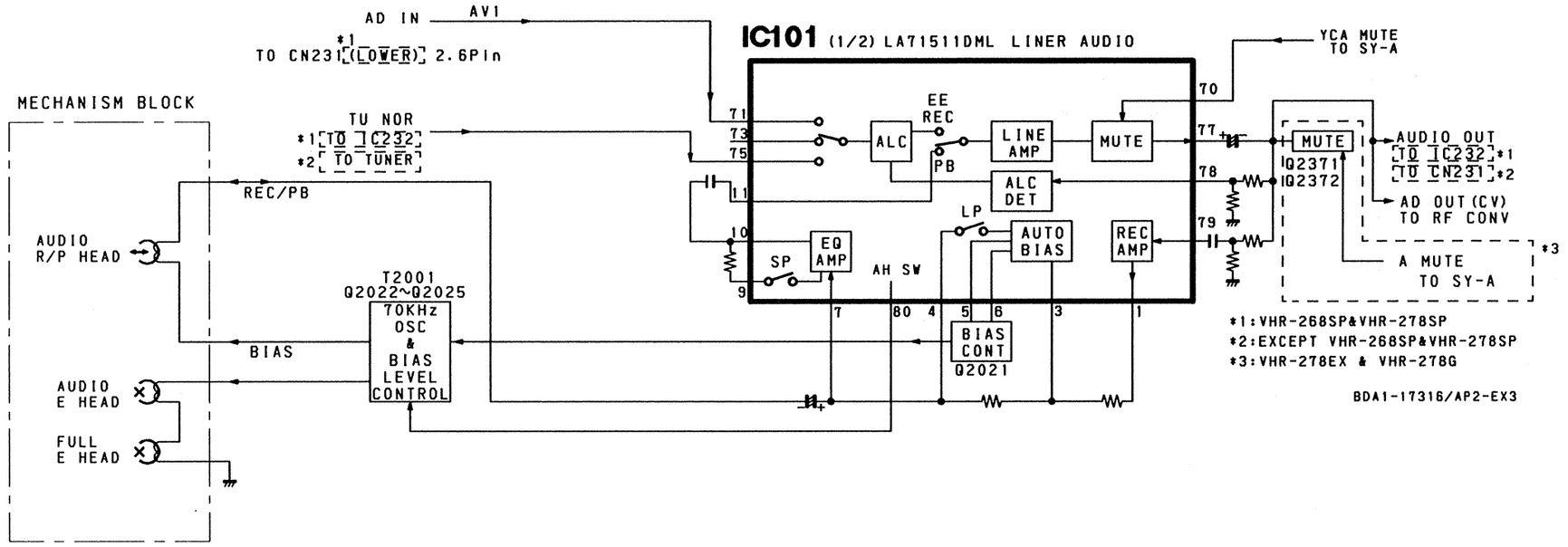
MECHANISM CONNECTION



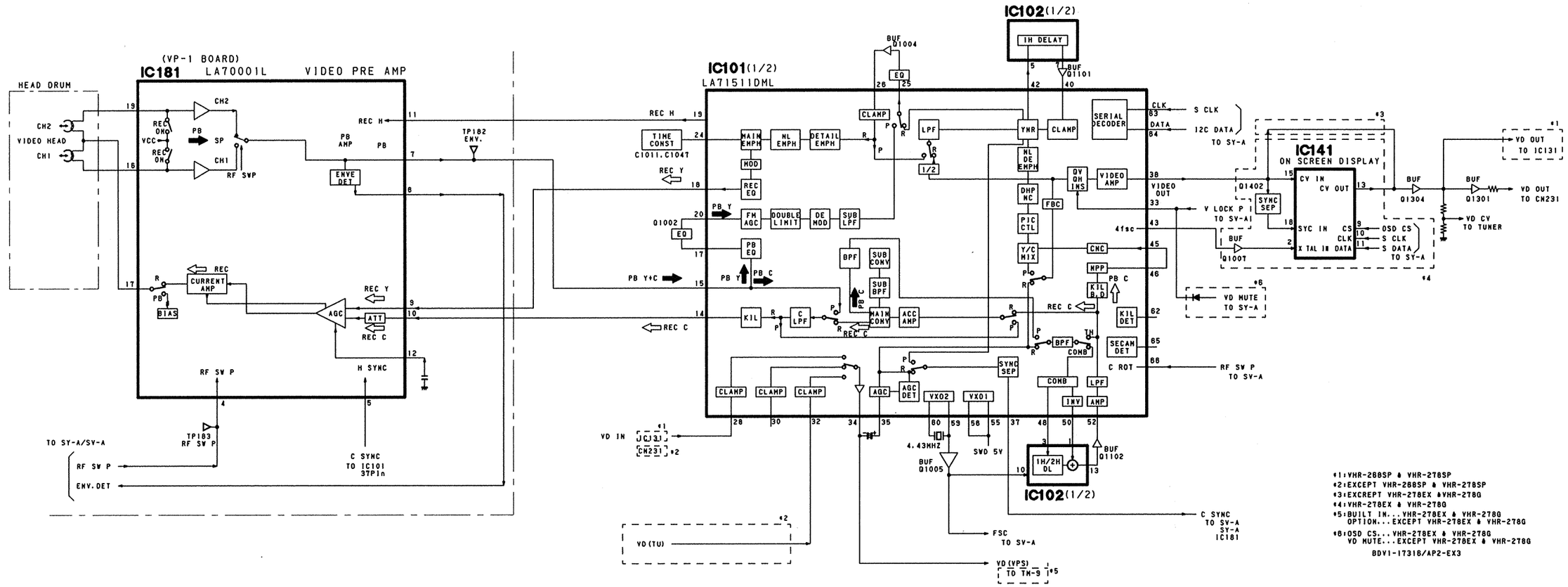
SYSTEM CONTROL & SERVO CIRCUIT



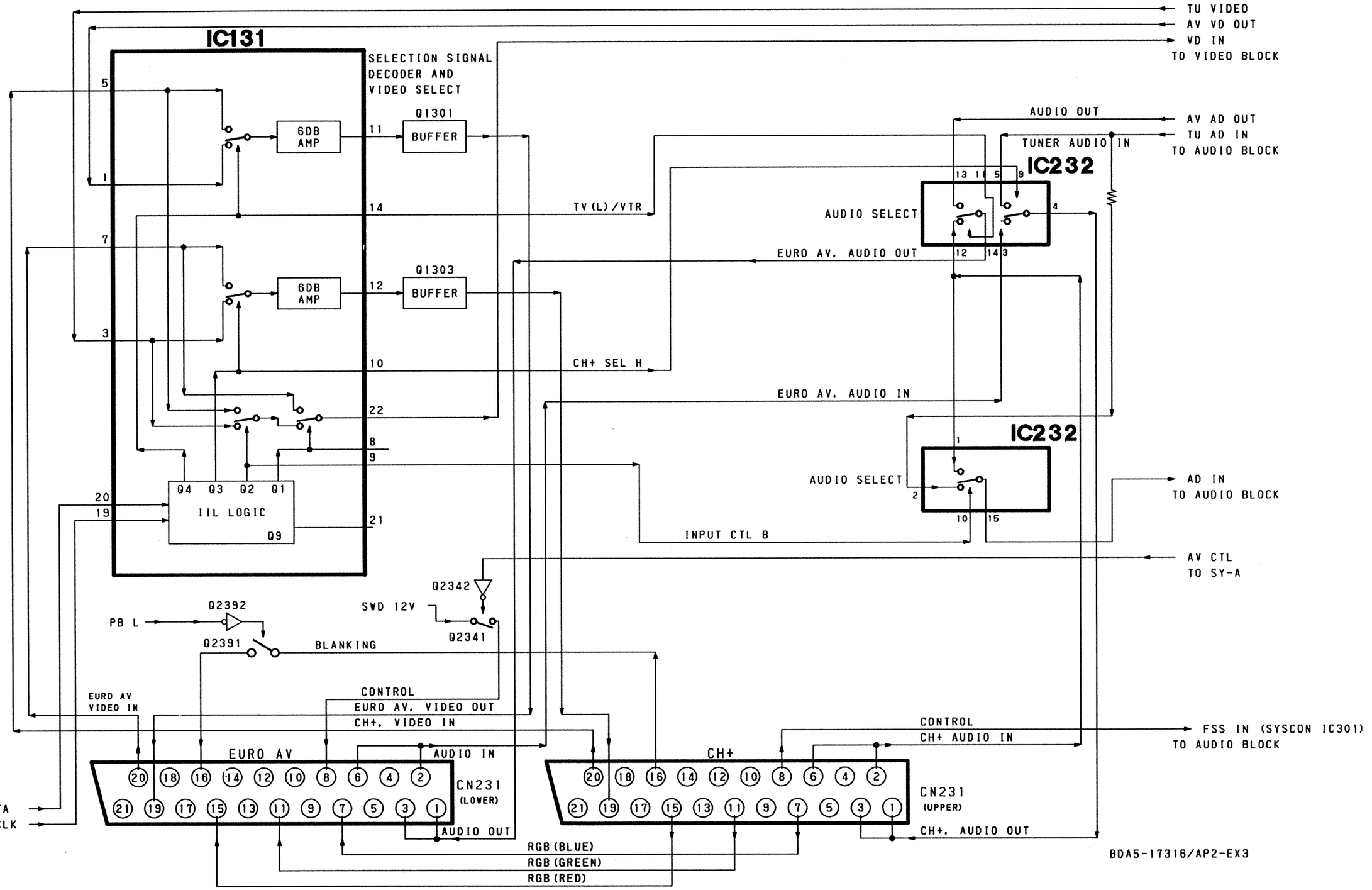
AUDIO CIRCUIT



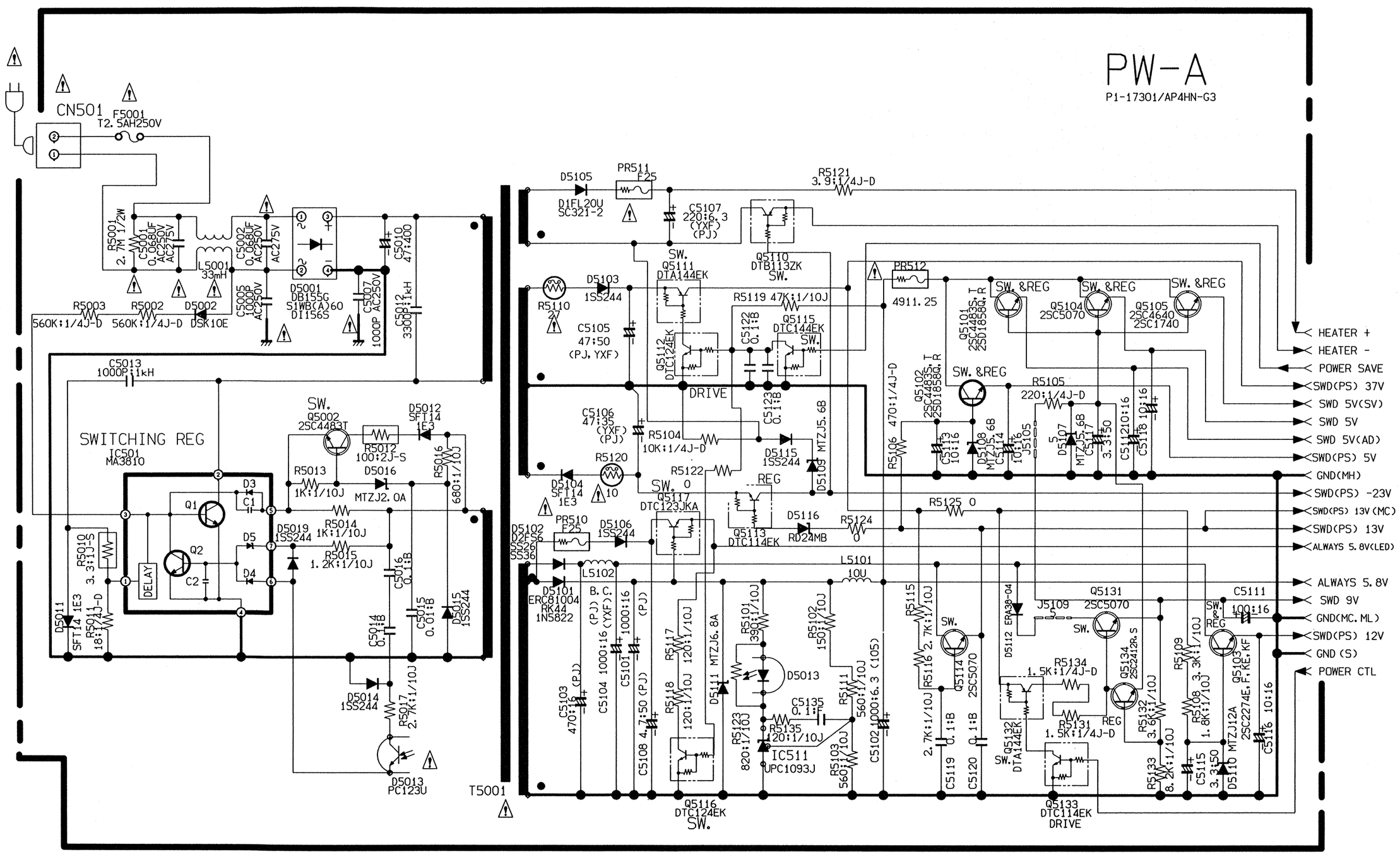
VIDEO CIRCUIT



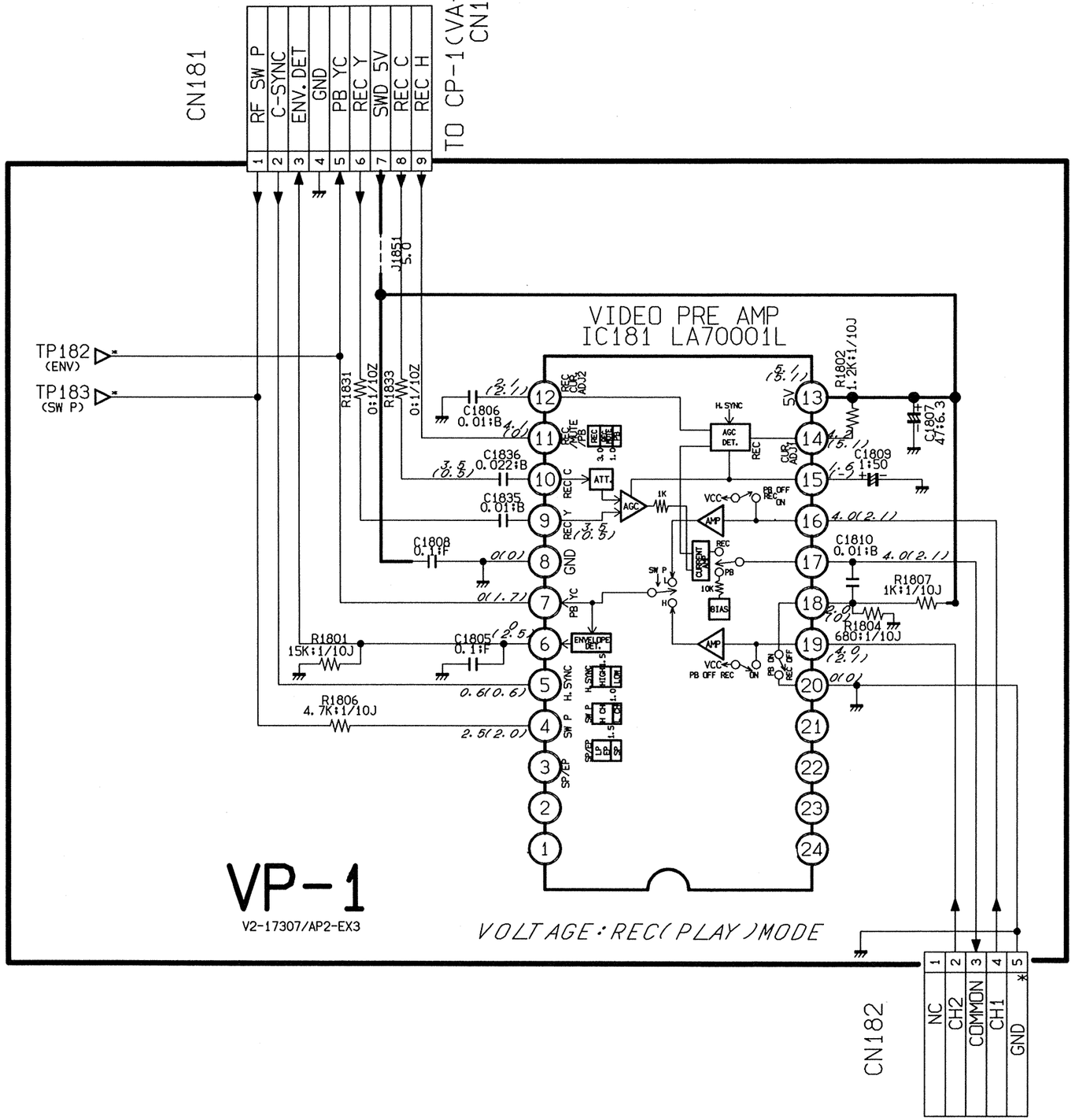
TERMINAL & INPUT / OUTPUT SELECTOR CIRCUIT(VHR-268SP & VHR-278SP)



CP-1 BOARD (PW-A) POWER SUPPLY



VP-1 BOARD VIDEO PRE-AMP

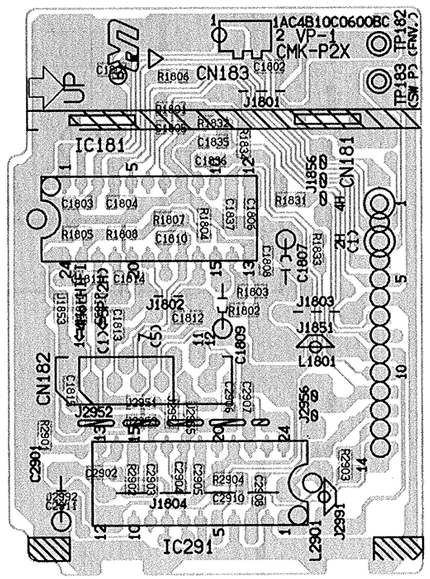


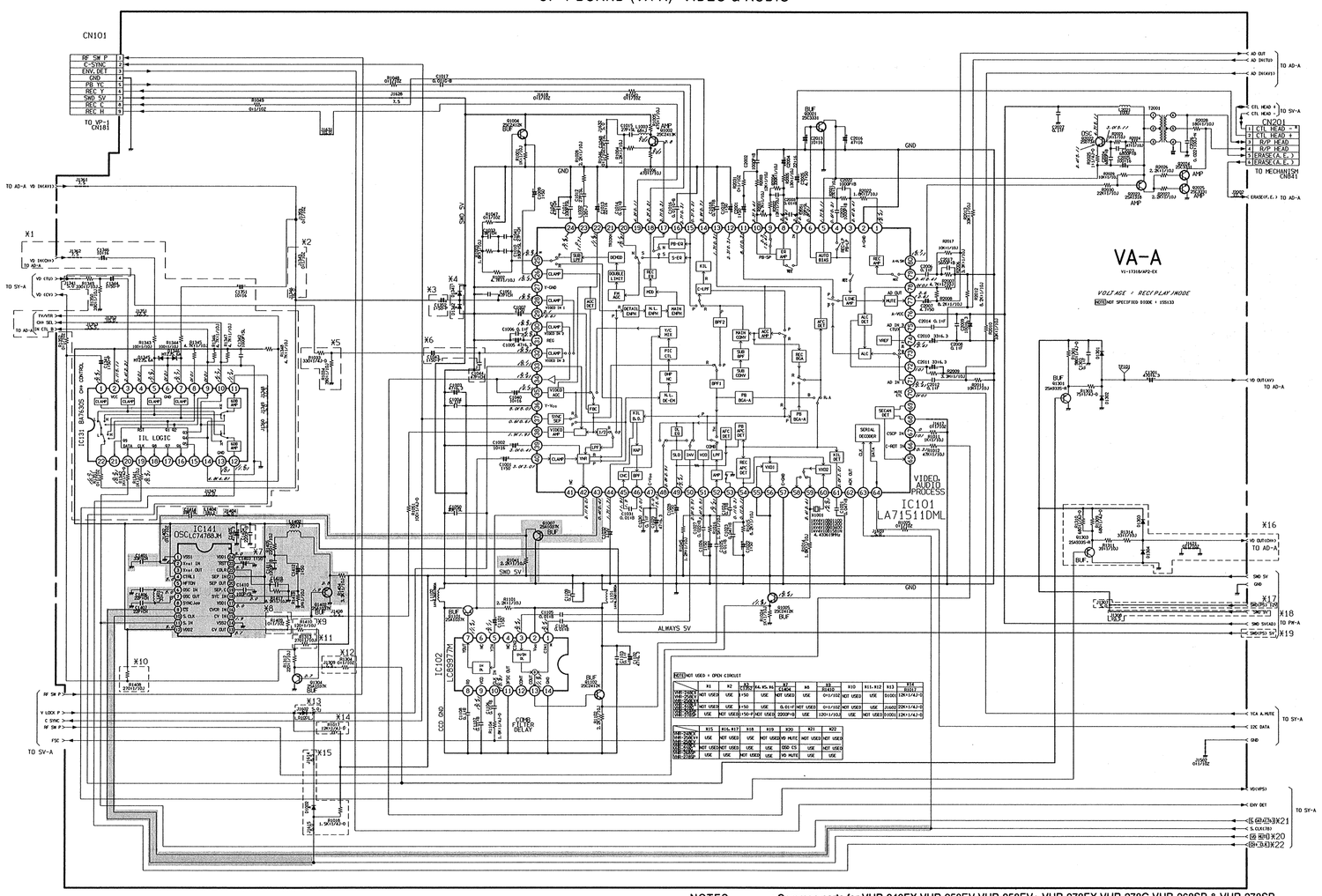
VP-1

V2-17307/AP2-EX3

VOLTAGE : REC(PLAY)MODE

VP-1 P.W.B.





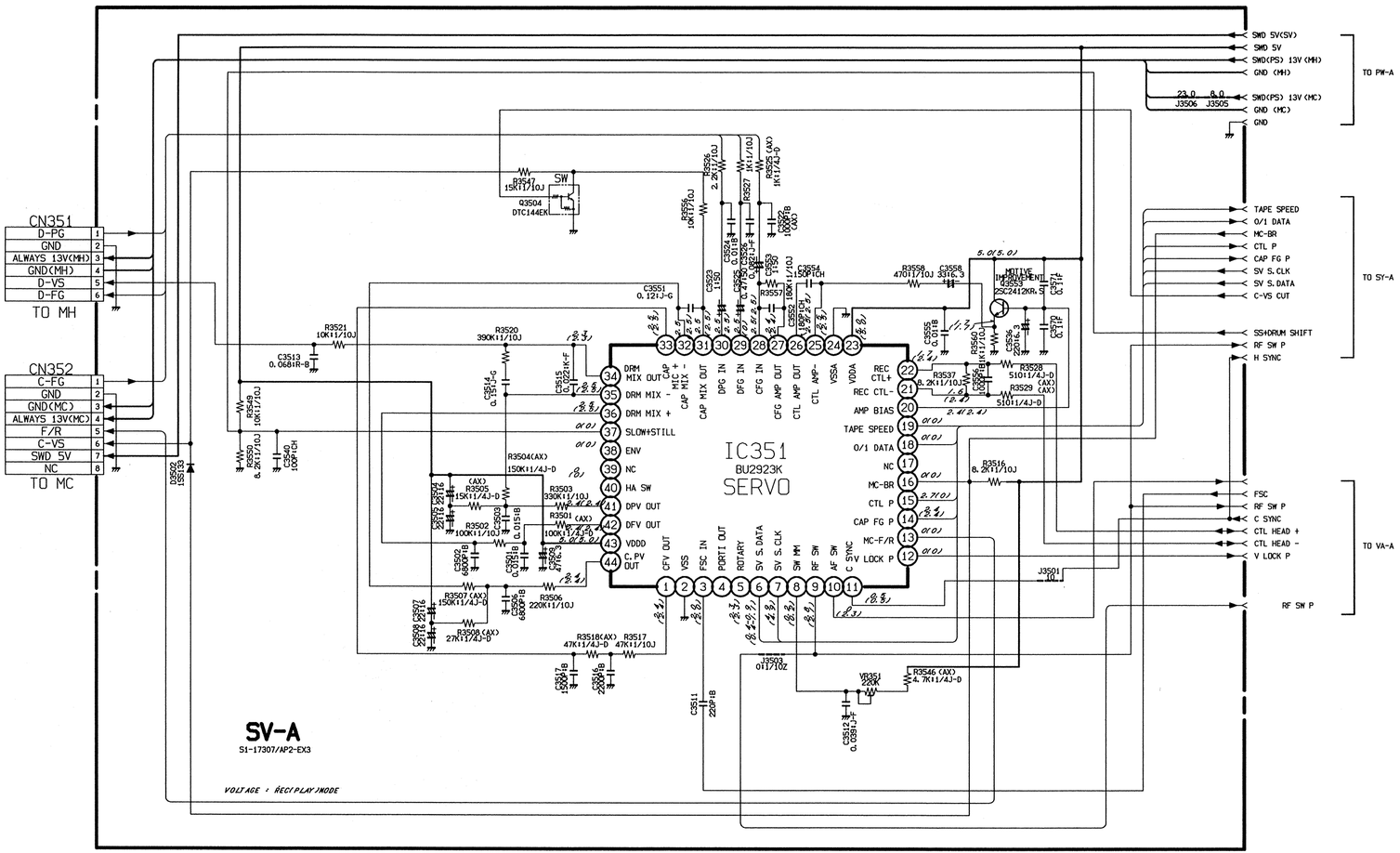
NOTES: ——— : Common parts for VHR-248EX,VHR-258EV,VHR-258EV+,VHR-278EX,VHR-278G,VHR-268SP & VHR-278SP.
The parts marked ▒▒▒ are VHR-278EX & VHR-278G.

VIDEO CIRCUIT WAVEFORMS

TEST LOCATION	WAVE FORM	TEST LOCATION	WAVE FORM
IC101 PIN14 REC 0.4Vp-p (REC C)		IC101 PIN37 REC, PLAY 4Vp-p (C SYNC)	
IC101 PIN15 PLAY 0.25Vp-p (PB Y, C)		IC101 PIN38 REC, PLAY 2Vp-p (VIDEO OUT)	
IC101 PIN18 REC 0.2Vp-p (REC Y)		IC101 PIN40, 42 REC, PLAY 0.35Vp-p	
IC101 PIN25, 26 REC, PLAY 0.5Vp-p		IC101 PIN45, 46 PLAY 0.4Vp-p	
IC101 PIN28 REC 1Vp-p (VIDEO IN)		IC101 PIN48, 50, 52 REC, PLAY 0.25Vp-p	

WF-V-PG2ZK

CP-1 BOARD (SV-A) SERVO



SERVO CIRCUIT WAVEFORMS

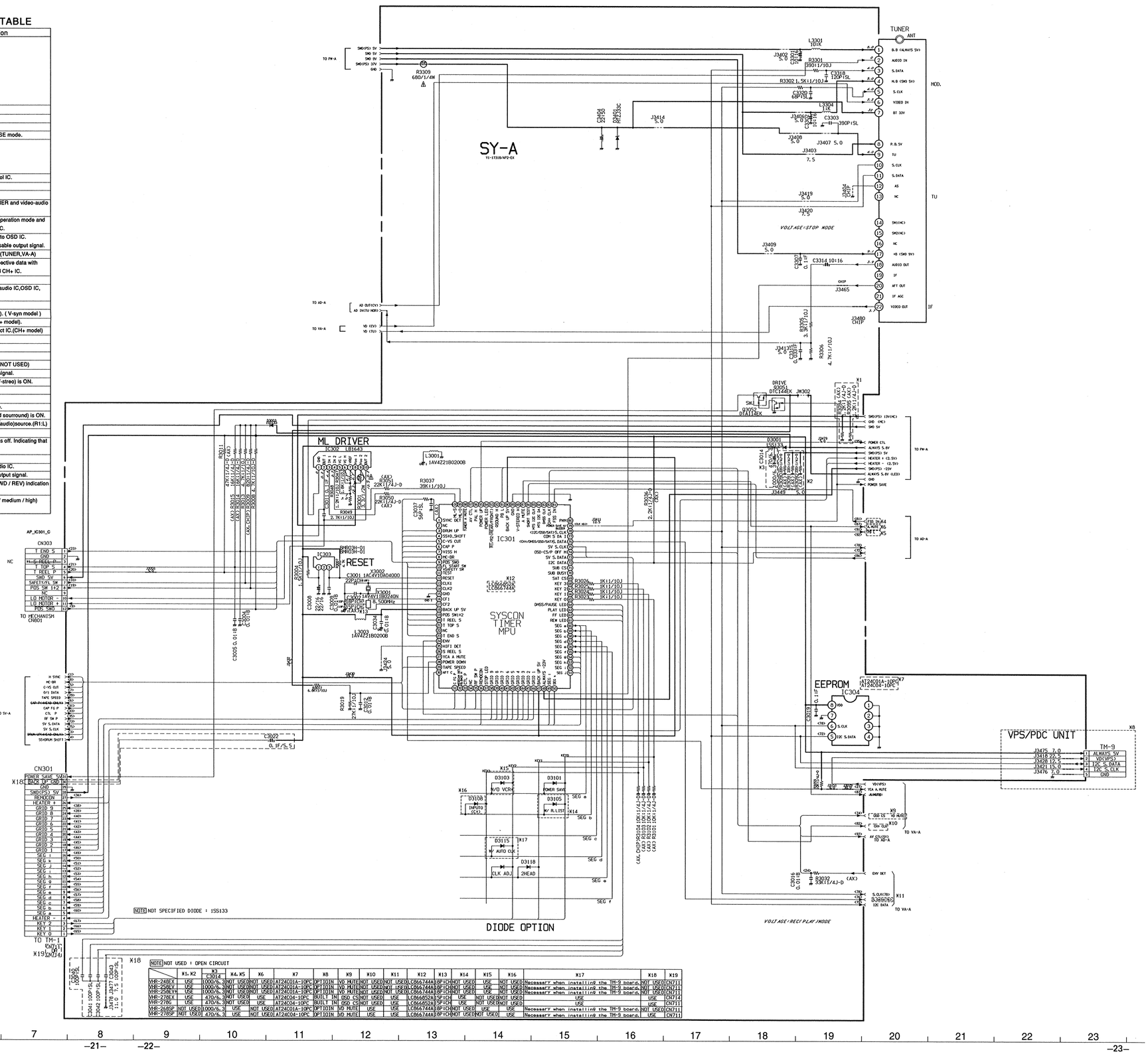
TEST LOCATION	WAVEFORM & MODE/LEVEL	TEST LOCATION	WAVEFORM & MODE/LEVEL
Pin 40 (H. A. SWITCHING)	SLOW PB 5.0V, 20msec 20msec	**Pin 15** (CTL PULSE)	REC 5.0V, 24msec 16msec
Pin 42 (PWM)	5.0V, 8.66KHz	**Pin 15** (CTL PULSE)	PB 850μsec, 5.0V, 40msec
Pin 41, 44, 1 (PWM)	5.0V, 69.27KHz	**Pin 21** (CTL HEAD-)	REC 3.6V, 1.4V, 24msec 16msec
Pin 3 (FSC INPUT)	0.3V, 4.43MHz	**Pin 22** (CTL HEAD+)	REC 1.4V, 3.6V, 24msec 16msec
Pin 5 (ROTARY)	PB 5.0V, 20msec 20msec	**Pin 26** (CTL AMP OUT)	PB 2.0V, 40msec
Pin 6 (D-PG MM)	2msec, 2.5V, 7msec	**Pin 28** (C-FG INPUT)	10mV, 1.32msec
Pin 9 (RF SW PULSE)	5.0V, 20msec 20msec	**Pin 29** (D-FG INPUT)	30mV, 1.33msec
Pin 10 (AF SW PULSE)	PB 5.0V, 20msec 20msec	**Pin 30** (D-PG INPUT)	250mV, 40msec
Pin 11 (COMPOSITE SYNC INPUT)	1~20msec, 4.2V	**Pin 38** (ENV. SW INPUT)	SLOW PB 4.0V, 20msec 20msec
Pin 14 (C-FG PULSE)	5.0V, 756.5Hz		

WF-S-PP

IC301 SYSTEM CONTROL,TIMER & TUNING CONTROL MPU PIN FUNCTIONS TABLE

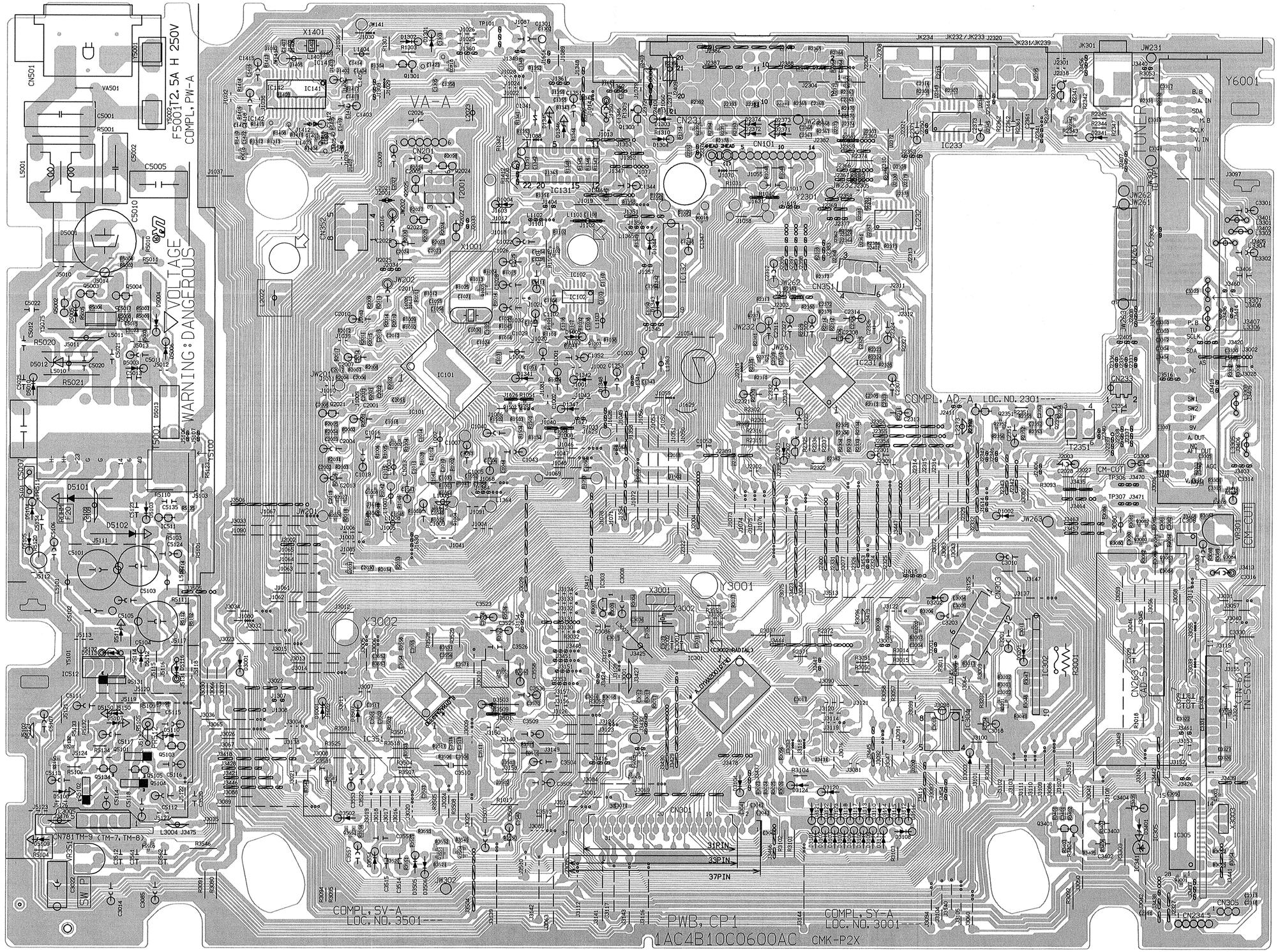
No.	Name	I/O	H/L	I/O Signal Function
1	SYNC DET	I	-	Sync. signal input for existing channel discrimination and TV system discrimination.
2	NC	-	-	-
3	DRUM UP	O	H	Head drum motor rotation speed up signal.
4	SS + DRUM SHIFT	O	-	Signal for indicating SLOW/STILL modes and alternation of drum motor control data. (3 value voltage)
5	C - Vs CUT	O	H	Cut off for capstan motor control voltage in SLOW / STILL modes.
6	CAP P.	O	H	Gain down control for Head Motor at SLOW mode.
7	VISS H	I	H	CTL pulse duty detection signal input. Used for VISS detection.
8	MC - BR	O	H	Brake signal for capstan motor.
9	POS SW0	I	L	Data indicating operation position of mechanism. (0V : SEARCH,STILL,SLOW,STOP,PLAY, and REC modes) (5V : EJECT,REW, and INITIAL modes)
10	FL- START + SAFETY SW	I	L	Switch input indicating start of cassette loading or discharge by cassette mechanism and detecting accidental erasure prevention tab of cassette tape.
11	-	-	-	-
12	RESET	I	L	Initial reset terminal for this IC.
13	CLK 1	-	-	Clock OSC during power failures.
14	CLK 2	-	-	Frequency is 32kHz.
15	VSS	-	-	Ground terminal
16	CF 1	-	-	IC clock OSC terminal.
17	CF 2	-	-	Frequency is 8.5MHz.
18	VDD	-	-	IC power supply terminal. (5Vdc)
19	POS SW1+2	I	-	Data indicating operation position of mechanism. (2V: EJECT,REW ,and INITIAL modes) (3.4V: STOP, PLAY,REC, and F-SEARCH modes) (2.5V: STILL and SLOW modes) (5V: R-SEARCH mode)
20	T. REEL S.	I	-	Pulse input for detection of take-up reel table rotation.
21	T. TOP S.	I	L	Sensor signal input for tape beginning detection.
22	NC	-	-	-
23	T. END S.	I	L	Sensor signal input for tape end detection.
24	ENV.	I	-	Video head envelope detection signal input for ATR function.
25	HiFi ENV.	I	-	Hi-Fi audio head envelope detection signal input for ATR function. (Hi-Fi model only)
26	S. REEL S.	I	-	Pulse input for detection of supply reel table rotation.
27	YCA MUTE	O	H	Signal to disable audio signal output.
28	POWER DOWN	I	L	Power failure detection terminal.
29	TAPE SPEED	I	-	Input of result of tape speed discrimination by digital servo IC.
30	AFT - C	I	-	Tuner AFT S-curve signal input for tuner AFT control.
31	C - FG P.	I	-	FG signal input of capstan motor.
32	MESECAM DET	I	-	Signal for indicating MESECAM mode.
33	CTL P.	I	-	CTL head recording / playback pulse signal input.
34	NC	-	-	-
35	RF SW P.	I	-	RF switching pulse input, created by head drum PG.
36	REMOCON	I	-	Remote control signal input.
37	STOP LED	O	H	Signal for indicating STOP mode.
38	G9	O	-	Display grid outputs (FLD).
39	G8	O	-	
40	G7	O	-	
41	G6	O	-	
42	G5	O	-	
43	G4	O	-	
44	G3	O	-	
45	G2	O	-	
46	G1	O	-	
47	VDD	-	-	IC power supply input.(5Vdc)
48	V LOAD	-	-	-23V input for FLD drive.
49	SEG i	O	-	Display segment outputs (FLD). (Includes key-scan output)
50	SEG k	O	-	
51	SEG j	O	-	
52	SEG i	O	-	
53	SEG h	O	-	
54	SEG g	O	-	
55	SEG f	O	-	
56	SEG e	O	-	
57	SEG d	O	-	
58	SEG c	O	-	
59	SEG b	O	-	
60	SEG a	O	-	
61	REW LED	O	H	Signal for indicating REW mode.
62	FF LED	O	H	Signal for indicating FF mode.
63	PLAY LED	O	H	Signal for indicating PLAY mode.
64	DMSS/PAUSE LED	O	H	Signal for indicating DMSS or PAUSE mode.
65	KEY IN 0	I	-	Operation key data inputs.
66	KEY IN 1	I	-	
67	KEY IN 2	I	-	
68	KEY IN 3	I	-	
69	SAT CS	O	H	Chip enable signal to satellite control IC.
70	SUB BUSY	I	H	NOT USED
71	SUB CS	O	H	NOT USED
72	I2C S.DATA	I/O	-	Data exchange with I2C ROM, TUNER and video-audio IC.
73	SV S. DATA	O	-	Output 8-bit X 4 serial data giving operation mode and tracking data, etc., to digital servo IC.
74	OSD CS / POWER OFF MUTE	O / H	H / O	Chip enable (access) signal output to OSD IC. / "H" output when power is off, for disable output signal.
75	SV S. CLK	O	-	The clock pulse for digital servo IC.(TUNER,VA-A)
76	COMMON DATA	O	-	Terminal for communication of respective data with OSD IC,DMSS IC, SAT CTL IC and CH+ IC.
77	COM S DA I	-	-	NOT USED
78	COMMON CLK	O	-	The clock pulse for TUNER, video-audio IC,OSD IC, satellite control IC and E2P ROM.
79	POWER SAVE	O	H	"H" output while "power off" mode.
80	TU PWM	O	-	Tuning voltage output (PWM signal). (V-syn model)
81	FSS IN	I	-	CH+ mode control signal input (CH+ model).
82	CH PLUS CLK	O	-	The clock pulse for CH+ in/out-select IC.(CH+ model)
83	DMSS CLK	O	-	Clock signal for audio DMSS unit.
84	MTS I2C DA	I/O	-	Data signal for MTS decoder.
85	MTS I2C CLK	O	-	Clock signal for MTS decoder.
86	SHORT TEST	I	I	REC mode indication signal input. (NOT USED)
87	A MUTE	O	L	"L" output for disable audio output signal.
88	V-STREO H	O	H	"H" output when simulated stoeo (V-streo) is ON.
89	VSS	-	-	IC ground terminal.
90	VDD	-	-	IC power supply input.(5Vdc)
91	PB L	O	L	Signal for indicating playback mode.
92	QSOUND H	O	H	"H" output when Q-sound(simulated sourround) is ON.
93	R1/R2	O	-	Signal for selecting AV-input(video/audio)source.(R1:L)
94	POWER LED	-	-	NOT USED
95	POWER UP	O	H	"HIGH" output except when power is off. Indicating that power is ON.
96	PAL H	O	H	Signal to indicate "PAL" mode.
97	AV CTL	O	-	Audio input source selecting for audio IC.
98	TUNER A MUTE	O	L	"L" output for disable tuner audio output signal.
99	ML- D	O	-	Loading motor rotation direction (FWD / REV) indication signal.
100	ML- S	O	-	Loading motor rotation speed (low / medium / high) indication signal.

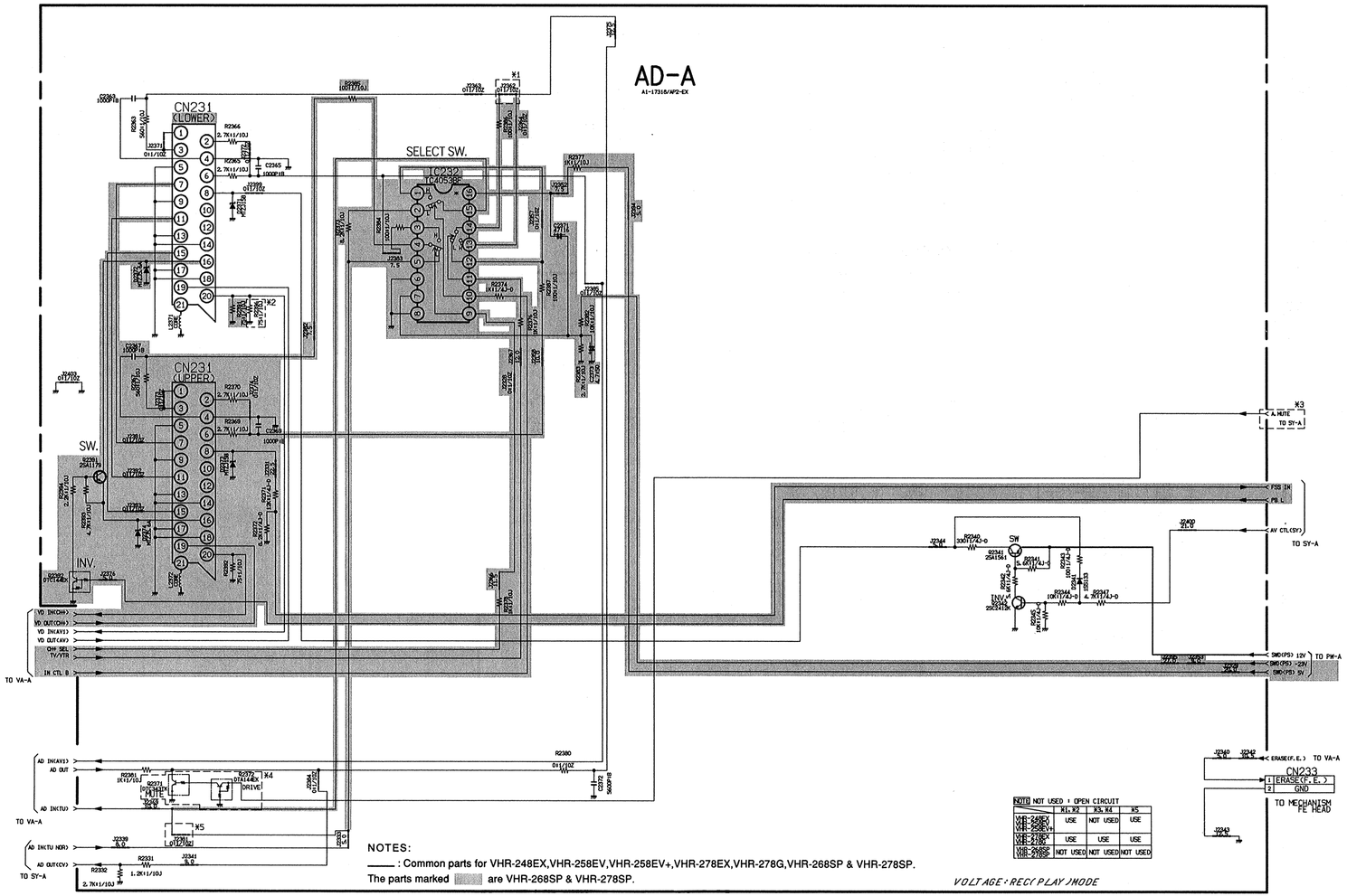
CP-1 BOARD (SY-A) SYSTEM CONTROL,TIMER & TUNER



	X1, X2	X3	X4, X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19
		C3014															
VHR-248EY	USE	1000/6.3	NOT USED	NOT USED	AT24C01A-10PC	OPTION	VD MUTE	NOT USED	NOT USED	LC866744A	BP1C	NOT USED	USE	NOT USED	Necessary when installing the TM-9 board.	NOT USED	CN711
VHR-256EY	USE	1000/6.3	NOT USED	NOT USED	AT24C01A-10PC	OPTION	VD MUTE	NOT USED	NOT USED	LC866744A	BP1C	NOT USED	USE	NOT USED	Necessary when installing the TM-9 board.	NOT USED	CN711
VHR-276EX	USE	470/6.3	NOT USED	USE	AT24C04-10PC	BUILT IN	OSD CS	NOT USED	USE	LC866852A	SP1C	H	USE	NOT USED	NOT USED	USE	CN714
VHR-276G	USE	470/6.3	NOT USED	USE	AT24C04-10PC	BUILT IN	OSD CS	NOT USED	USE	LC866852A	SP1C	H	USE	NOT USED	NOT USED	USE	CN711
VHR-256SP	NOT USED	1000/6.3	USE	NOT USED	AT24C01A-10PC	OPTION	VD MUTE	USE	USE	LC866744A	BP1C	H	NOT USED	USE	USE	NOT USED	CN711
VHR-276SP	NOT USED	470/6.3	USE	NOT USED	AT24C04-10PC	OPTION	VD MUTE	USE	USE	LC866744A	BP1C	H	NOT USED	USE	USE	USE	CN711

CP-1 P.W.B.


F500112. 5A H 250V
COMPL, PW-A
VOLTAGE
WARNING : DANGEROUS
VA-A
COMPL, AD-A LOC. NO. 2301
COMPL, SV-A
LOC. NO. 3501
PWB, CP1
1AC4B10C0600AC
CMK-P2X
COMPL, SY-A
LOC. NO. 3001
TUNER
CM-CUT
31PIN
33PIN
37PIN
CN781TM-9 (TM-7, TM-8)



NOTES:
——— : Common parts for VHR-248EX,VHR-258EV,VHR-258EV+,VHR-278EX,VHR-278G,VHR-268SP & VHR-278SP.
The parts marked ▒▒ are VHR-268SP & VHR-278SP.

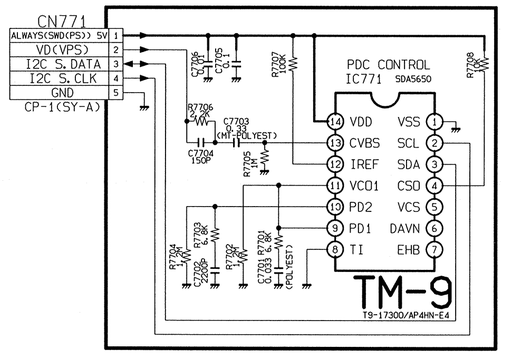
NOTE: NOT USED : OPEN CIRCUIT

	K1, K2	K3, K4	K5
VHR-248EV, VHR-258EV+	USE	NOT USED	USE
VHR-278EX, VHR-278G	USE	USE	USE
VHR-268SP, VHR-278SP	NOT USED	NOT USED	NOT USED

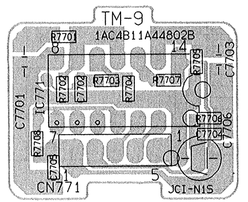
VOLTAGE : REC(PLAY)MODE

TM-9 BOARD PDC/VPS
(ASSEMBLED FOR VHR-278EX & VHR-278G,
OPTION FOR EXCEPT VHR-278EX & VHR-278G)

*1 : The D3115 is necessary on the SY-A block when installing the TM-9 board.

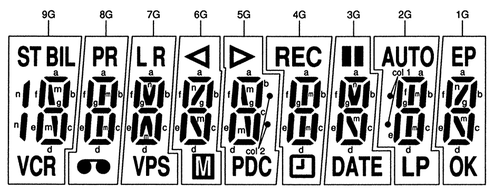


TM-9 P.W.B.
(ASSEMBLED FOR VHR-278EX & VHR-278G,
OPTION FOR EXCEPT VHR-278EX & VHR-278G)



A7101 DISPLAY (FLD) GRID/ANODE ASSIGNMENT DRAWING & TABLE

GRID & SEGMENT ASSIGNMENT

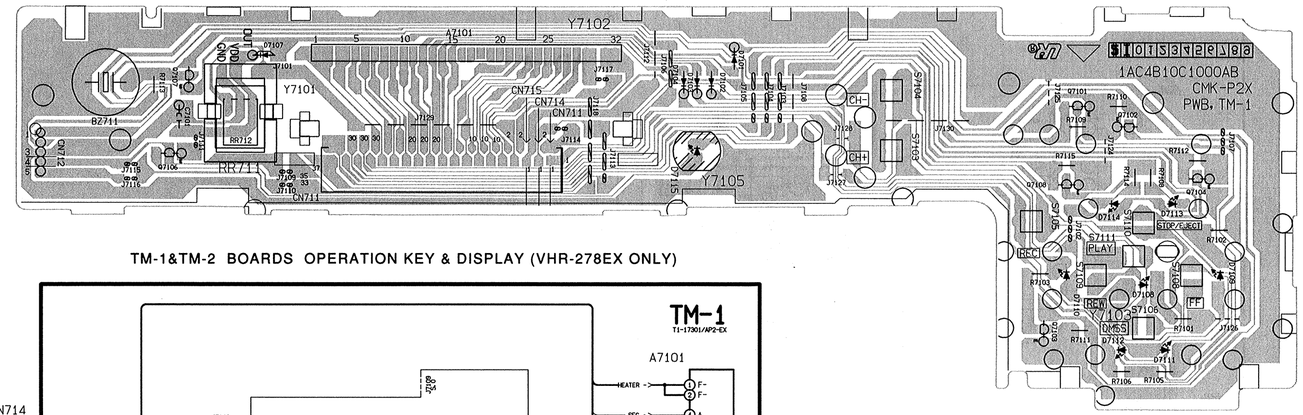


ANODE CONNECTION

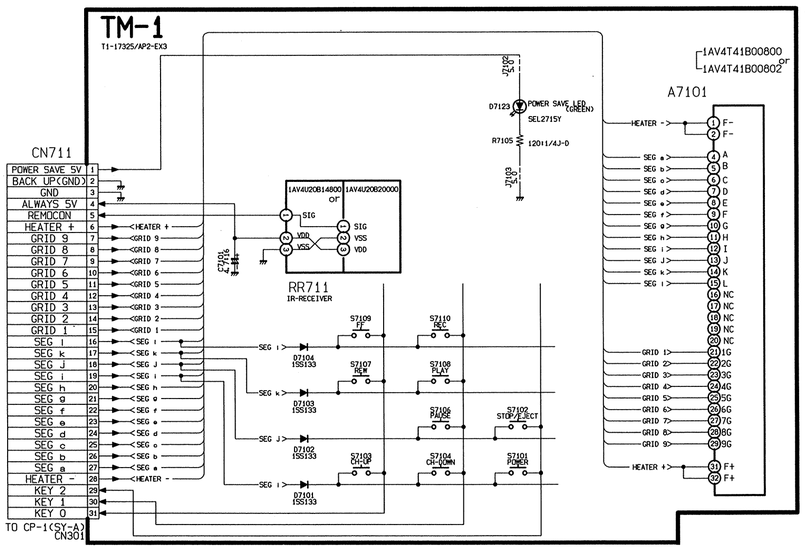
GRID / SEGMENT	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	ST	PR	L	◁	▷	REC	▮▮	AUTO	EP
b	n	—	n	n	—	—	n	—	n
c	a	a	a	a	a	a	a	a	a
d	b	b	b	b	b	b	b	b	b
e	c	c	c	c	c	c	c	c	c
f	d	d	d	d	d	d	d	d	d
g	e	e	e	e	e	e	e	e	e
h	f	f	f	f	f	f	f	f	f
i	g	g	g	g	g	g	g	g	g
j	m	m	m	m	m	m	m	m	m
k	BIL	—	VPS	—	col 2	—	—	col 1	—
l	VCR	●●	R	M	PDC	⏎	DATE	LP	OK

GR-00800

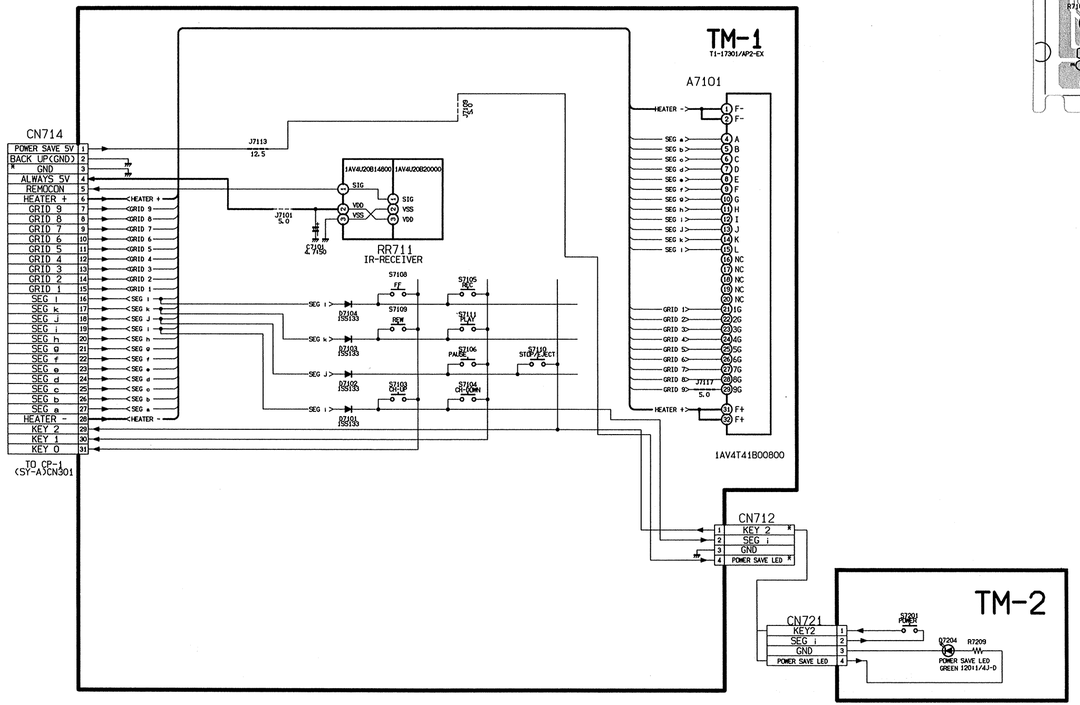
TM-1 P.W.B. (VHR-278EX ONLY)



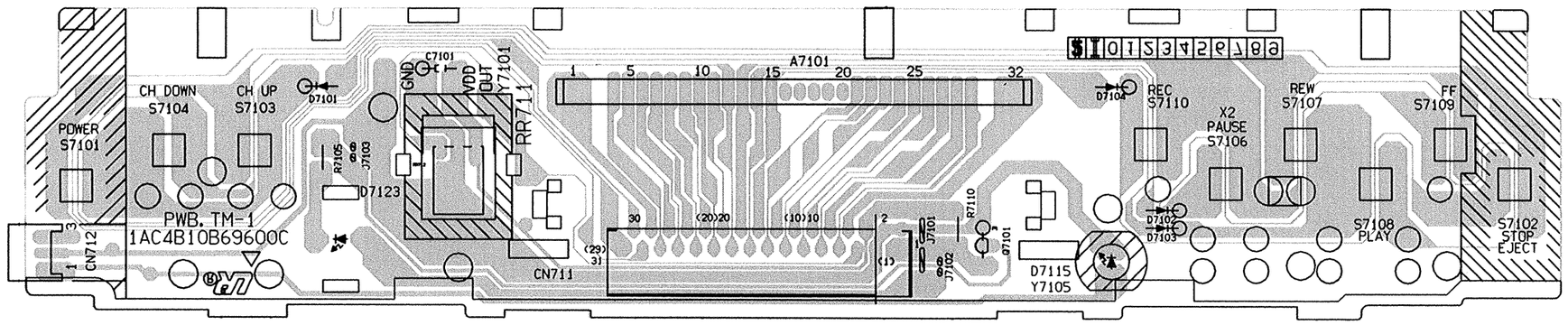
TM-1 BOARD OPERATION KEY & DISPLAY (EXCEPT VHR-278EX)



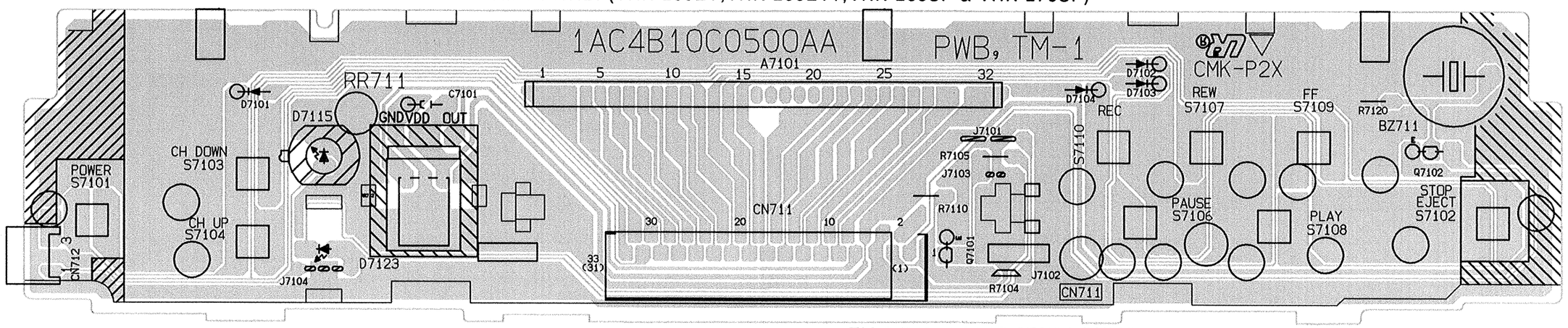
TM-1&TM-2 BOARDS OPERATION KEY & DISPLAY (VHR-278EX ONLY)



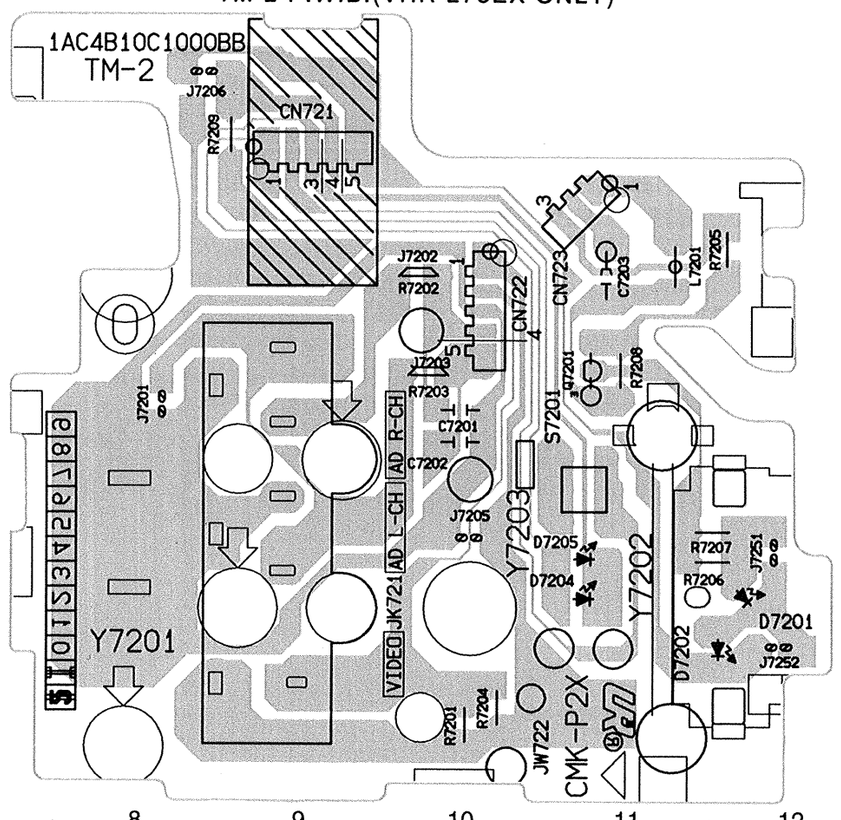
TM-1 P.W.B. (VHR-248EX & VHR-278G)



TM-1 P.W.B. (VHR-258EV,VHR-258EV+,VHR-268SP & VHR-278SP)



TM-2 P.W.B.(VHR-278EX ONLY)



FILE NO.

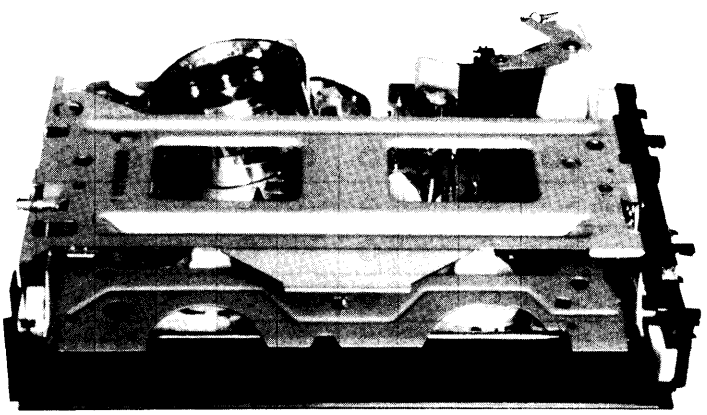
BASIC SERVICE TECHNICAL INFORMATION

SANYO

FISHER®

Video Cassette Recorder

V95 I MECHANISM



VHS
PAL SECAM NTSC

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REFERENCE No.MM531433

Notice

SANYO

- [●] CORRECTION
- [ ] PRODUCTION CHANGE
- [ ] SERVICE FLASH
- [ ] ADD INFORMATION
- [ ]
- [ ]

FISHER

FILE NO.

Please add this notice to the manual listed below.

Category : VIDEO CASSETTE RECORDER **Date : July/10/ '95**

Model : V95I MECHANISM **REF : No. MM531433**

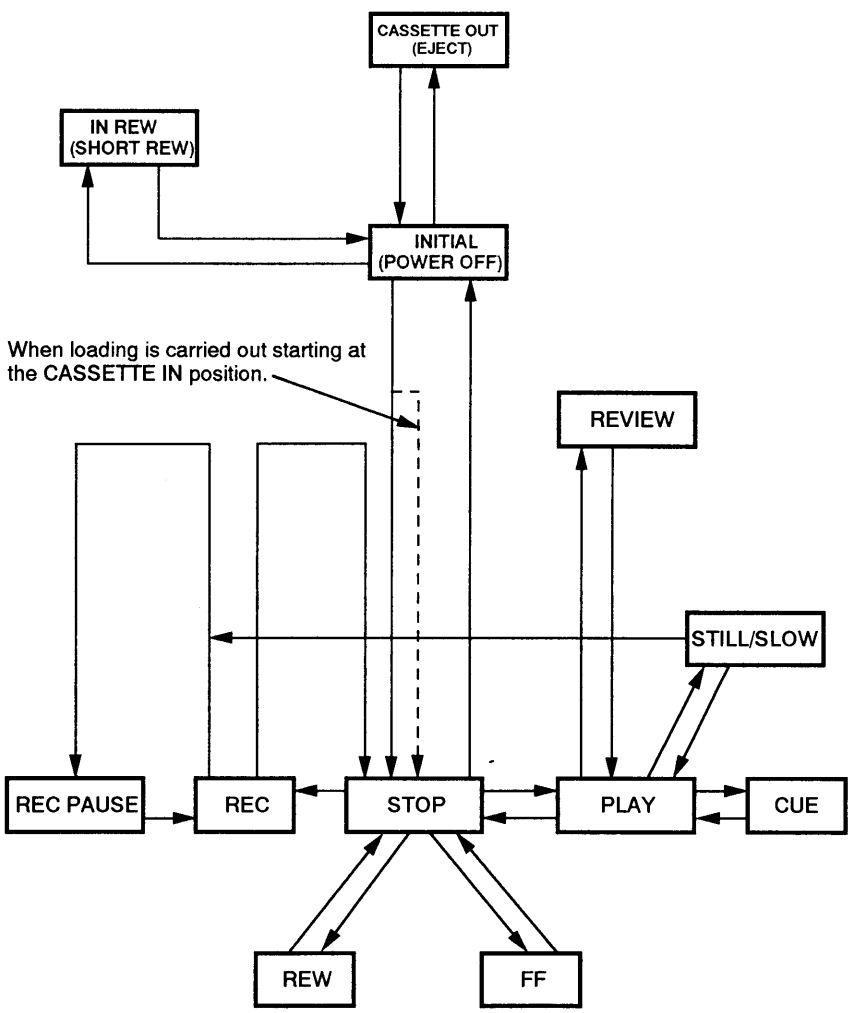
This correction notice is a revised edition of the V95I mechanism basic service technical information (Reference No. MM531433).

2-2. AN OVERVIEW OF THE MECHANISM MODES

2-2-1. MECHANISM MODE SWITCHING TABLE

NOTE: The letters and figures enclosed in circles in the mechanism mode column are the codes on the crescent slide.

HEX DATA	Mechanism mode
6	EJECT Ⓔ Distinguished by whether the EP switch is ON or OFF. Horizontal shift section. Vertical shift section.
2	IN REW
0	
7	INITIAL ⑦
0	Cleaner roller assembly: ON
1	S/T mounting incline assembly pressure begins.
0	
1	S/T mounting incline assembly pressure ends.
	REVIEW ①
0	
2	IDLER pos. ② (Pinch roller OFF)
0	
3	STILL/SLOW ③
0	
5	PLAY/STOP ⑤
0	
4	BRAKE pos. ④
0	
6	FF/REW ⑥



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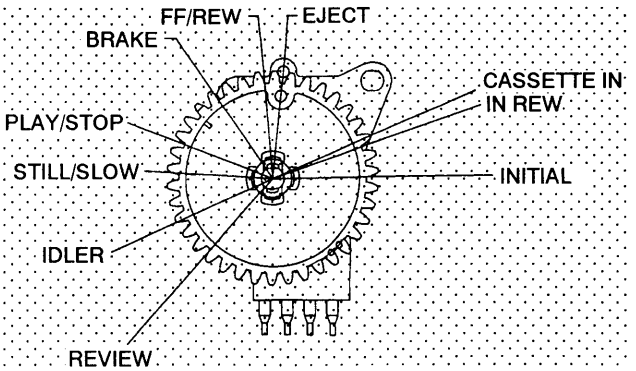
SANYO Electric Co., Ltd
Osaka, Japan

REFERENCE No. MM 531433-01

MODE SWITCH OUTPUT TABLE

HEX DATA	SW DATA 1	SW DATA X	SW DATA Y	SW DATA Z	SW DATA 2
0	5.0V	H	H	H	5V
1	5.0V	H	H	L	0V
2	2.5V	H	L	H	5V
3	2.5V	H	L	L	0V
4	3.4V	L	H	H	5V
5	3.4V	L	H	L	0V
6	2.0V	L	L	H	5V
7	2.0V	L	L	L	0V

APPEARANCE OF MODE SWITCH AND RELATIONSHIP BETWEEN MODE POSITIONS



2-2-2. MOVEMENT CHECK LIST FOR THE MAIN PARTS OF THE MECHANISM

(S): Strength (W): Weakness

Principal parts \ Mechanism mode	EJECT	IN REW	INITIAL (POWER OFF)	(LOADING)	(UNLOADING)	REV	IDLER	STILL/SLOW	PLAY/STOP	BRAKE	FF/REW	
T brake assembly	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON/OFF	
S brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON/OFF	
T soft brake assembly	OFF	OFF	***OFF***	ON	ON	ON	ON	OFF	OFF	OFF	OFF	
S soft lever	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	
BT lever assembly	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	
BT spring	OFF	OFF	OFF	OFF	OFF	ON(W)	ON(W)	ON(S)	ON(S)	ON(S)	ON(W)	
Pinch roller lever assembly	UP	UP	UP	UP/ DOWN	DOWN/ UP	ON	OFF	ON	ON	OFF	OFF	
Clutch mounting assembly	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	FF	
Load lever assembly	UNLO	UNLO	***UNLO***	LO	LO	LO	LO	LO	LO	LO	LO	
Capstan brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	
S and T incline mounting assembly				LO	UNLO							
Cleaner roller assembly	OFF	OFF	OFF	(ON)	(ON)	OFF	OFF	OFF	OFF	OFF	OFF	

2-2-3. HOW TO CHECK THE MECHANISM MODE POSITION

You can tell which mode the mechanism is currently in by looking at the codes and marking-lines on the crescent slide on the underside of the mechanism chassis. The edge of the crescent mounting is used as the reference line, as shown in Fig.2-2-2, and the marking-lines and symbols indicating the mechanism modes are displayed on the crescent slide, which slides against the edge of the crescent mounting. The mechanism mode is read off from the marking-line on the slide crescent which is aligned with the reference-line on the crescent mounting.

Example: In Fig.2-2-2, marking-line 6 is aligned with the reference-line on the crescent mounting, so the mechanism is seen to be in FF/REW mode.

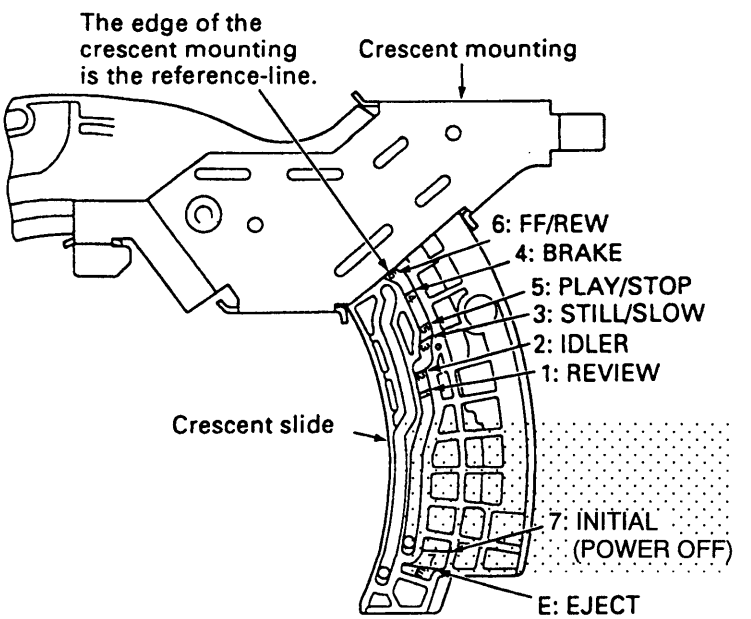


Fig.2-2-2

2-2-4. SELF-DIAGNOSIS DISPLAY

Some models are equipped with the SELF-DIAGNOSIS DISPLAYS function.

Use it as a means of finding out the symptoms and cause of the error before performing repairs.

For details, refer to the separate service manual for the respective models.

1. MAINTAINING AND CHECKING THE MECHANISM

1-1. REGULAR CHECKS AND MAINTENANCE ITEMS

To obtain full function and maximum performance from the set, and to stop it getting dirty or scratched, we recommend that you carry out the following maintenance procedures and regular checks. The maintenance checks described in the following section should also be carried out without fail after carrying out any repairs to the set.

NOTE: OIL AND GREASE

- Always use the specified brands of oil and grease. If you use a grease with the wrong viscosity, for example, this can lead to all sorts of problems. Be careful to keep the oil and grease free of dust and foreign bodies.
- A "drop" of oil is the amount of oil remaining on the tip of a rod with a diameter of 1.5mm after it is dipped in oil to a depth of 1cm and then taken out.

1-1-1. REGULAR CHECKS

○Clean ◎Check △Oil

Part maintained \ Hours of use (H)		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	Remarks
Tape path system	Tape guide	○	○	○	○	○	○	○	○	○	○	
	ACE head, full erase head	○	○	○	○	○	○	○	○	○	○	
	Cylinder (drum)	○	○ (◎)	○ (◎)	○ (◎)	○ (◎)	○ (◎)	○ (◎)	○ (◎)	○ (◎)	○ (◎)	The life of parts varies enormously, depending on the environment in which the part is used.
	Cleaner roller assembly		◎		◎		◎		◎		◎	
	Pinch roller	○	○	○	○	○	○	○	○	○	○	
Drive system	Reel table		○		○△		○		○△		○	
	Reel belt	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	Relay gear, Pulley shaft, Gear shaft		△		△		△		△		△	
	Loading motor		◎		◎		◎		◎		◎	
Perform-ance checks	Back tension		◎		◎		◎		◎		◎	Playback tension torque: 30 to 50g/cm
	Brake system		◎		◎		◎		◎		◎	
	FWD, REW, PLAY torque, REV torque		◎		◎		◎		◎		◎	FWD: 600g/cm or over REW: 600g/cm or over PLAY (SP mode): 80 to 140g/cm REV: 120 to 220g/cm

1-1-2. CLEANING

1. Cylinder (Drum) (See Fig.1-1-1)

Moisten a chamois with methyl alcohol and clean the video head (including the Hi-Fi audio head) and the tape path surface of the cylinder. Be sure to wipe horizontally in relation to the video head. If you wipe vertically, or use excessive force, you can damage the video head.

2. Tape Path System / Reel Drive System

Clean the pinch roller, the capstan shaft, the tape guides, the FE head, the ACE head, the reel table, the pulley and the reel belt with a soft cloth, or chamois, moistened with methyl alcohol.

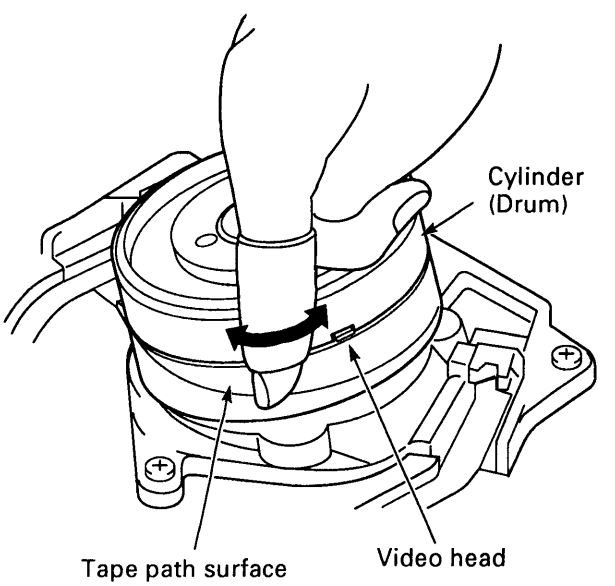


Fig.1-1-1

1-2. SERVICE TOOLS

1-2-1. SERVICE TOOLS

NOTES ON ALIGNMENT TAPES

Select a PAL or NTSC alignment tape from the list below, according to the transmission system of the VCR you are repairing.

PAL: For models with 625 scanning lines and a field frequency of 50Hz

NTSC: For models with 525 scanning lines and a field frequency of 60Hz

No.	Tool	Tool No.		Remarks
		NTSC	PAL	
1	Alignment tape	VHJ-0005	VHJ-0008	SP colour bar 1kHz (normal)
2	Alignment tape	VHJ-0006	VHJ-0009	SP monoscope 7kHz (normal)
3	Alignment tape	VHJ-0007	———	EP monoscope
4	Alignment tape	———	VHJ-0052	LP monoscope
5	Eccentric screw driver	VHJ-0003		Used to adjust the tape path
6	Nut box	VHJ-0048		Used to adjust the height of the lever load assembly
7	Torque dial gauge	VHJ-0004		Used to measure reel winding torque
8	Cassette torque meter	VHJ-0016		Used to measure back tension torque
9	Load lever assembly height adjustment tool	VHJ-0102		Used to adjust the height of the load lever assembly
10	Torque gauge screwdriver	VHJ-0014		Used to adjust the tightening torque of screws
11	3 mm dia. bit for torque screwdriver	VHJ-0045		Used to replace the bit of the torque gauge screwdriver
12	Video head removing tool	VHJ-0041		Used to remove the upper cylinder
13	Oil	VHJ-0099		
14	Grease	VHJ-0100		
15	Grease	VHJ-0101		
16	Relay cables	VHJ-0106		Relay cables of mechanism and CP-1 PWB assembly

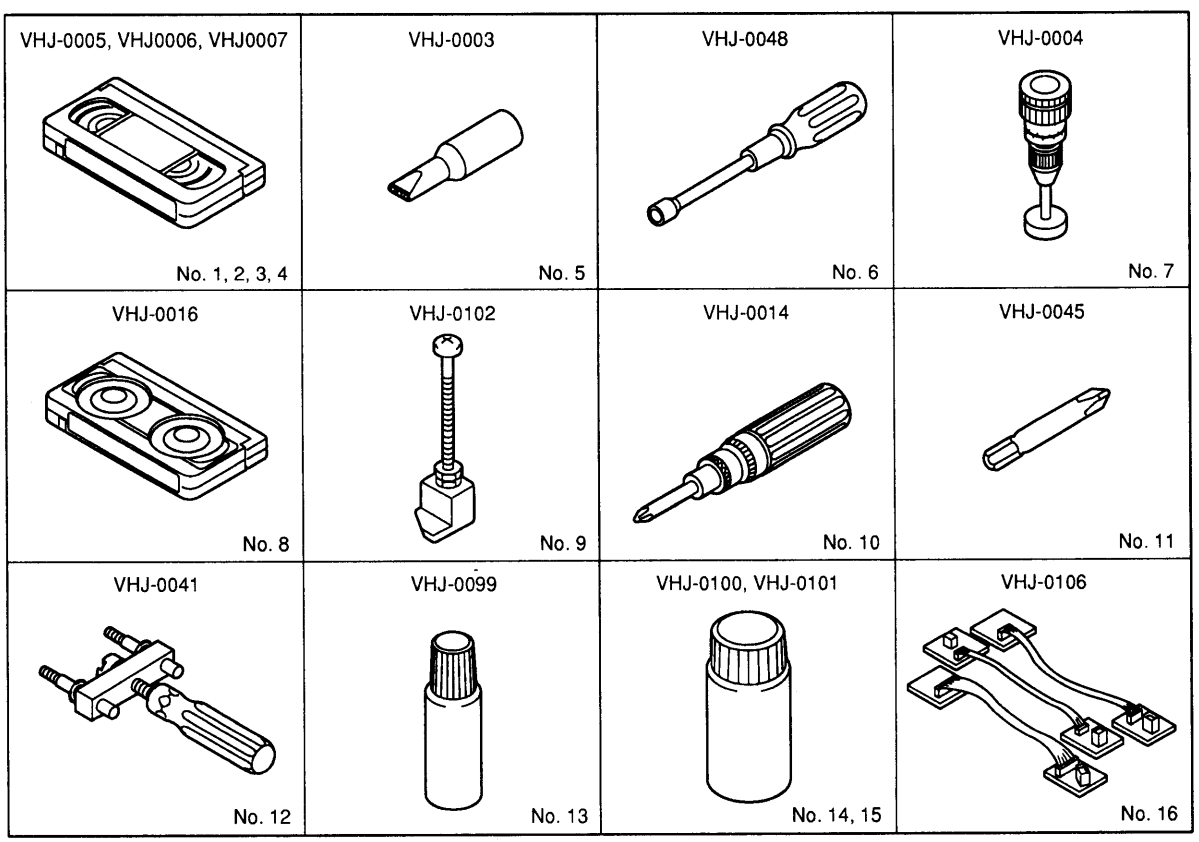


Fig.1-2-1

1-2-2. Using the Relay Cable (VHJ-0106)

The mechanism can be repaired without using the relay cable (VHJ-0106). As shown in Fig. 1-3-1, the relay cable (VHJ-0106) is a tool used for relay between the CP-1 PWB assembly and mechanism unit.
When connecting it, take note of the pin number of the connector.

NOTE 1: Do not place the mechanism upright as shown in Fig. 1-3-1 when inserting/ejecting the cassette.
NOTE 2: For NTSC models, be sure to connect the VM-1 PWB assembly and CP-1 PWB assembly.

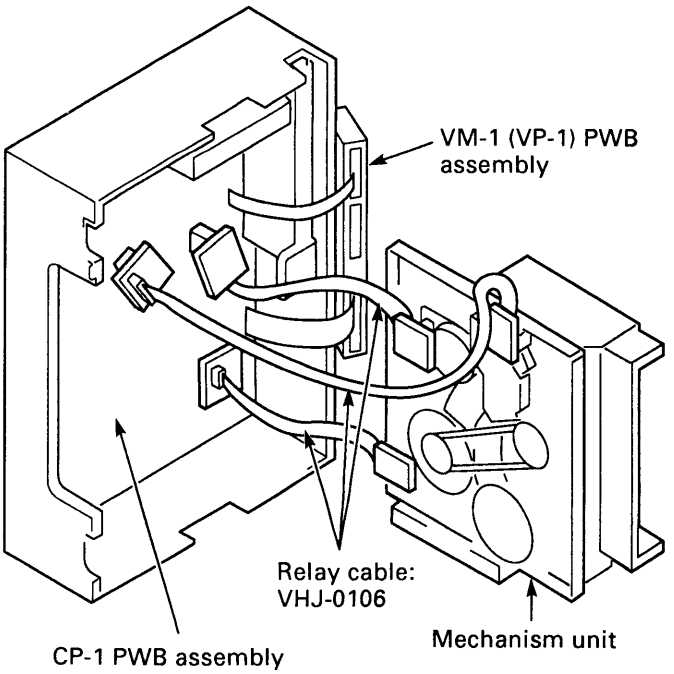


Fig. 1-2-2

2. AN OVERVIEW OF THE MECHANISM

2-1. NAMES OF THE MAIN PARTS

2-1-1. CASSETTE MECHANISM ASSEMBLY

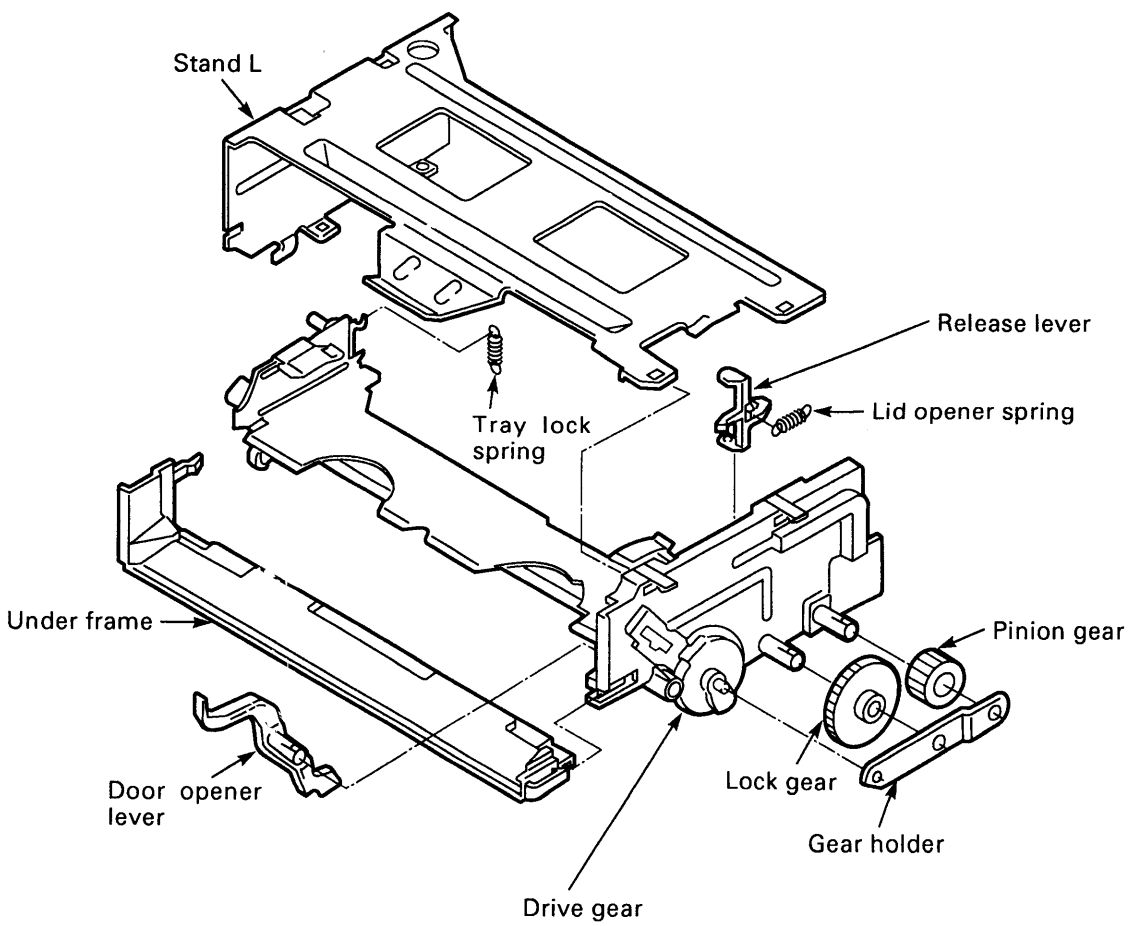


Fig. 2-1-1

2-1-2. TOPVIEW

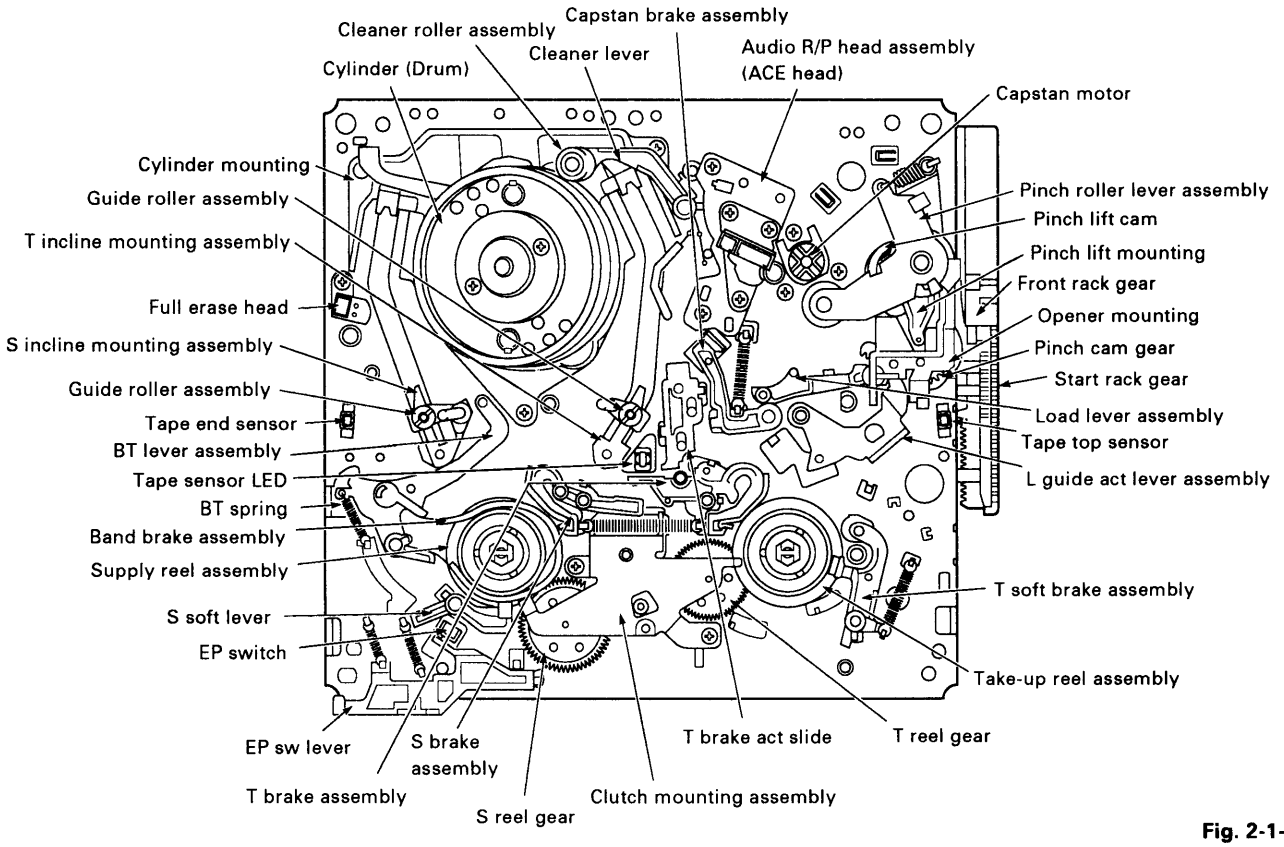


Fig. 2-1-2

2-1-3. UNDERSIDE

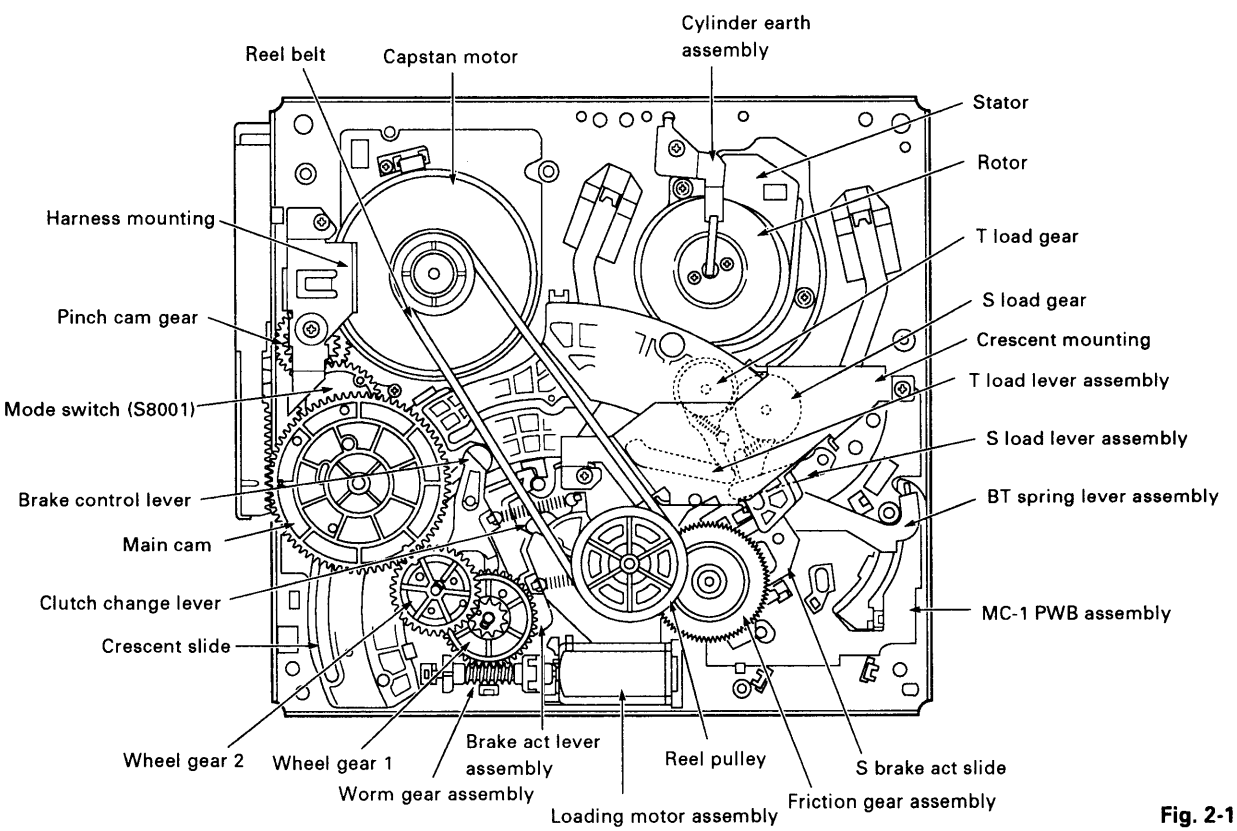


Fig. 2-1-3

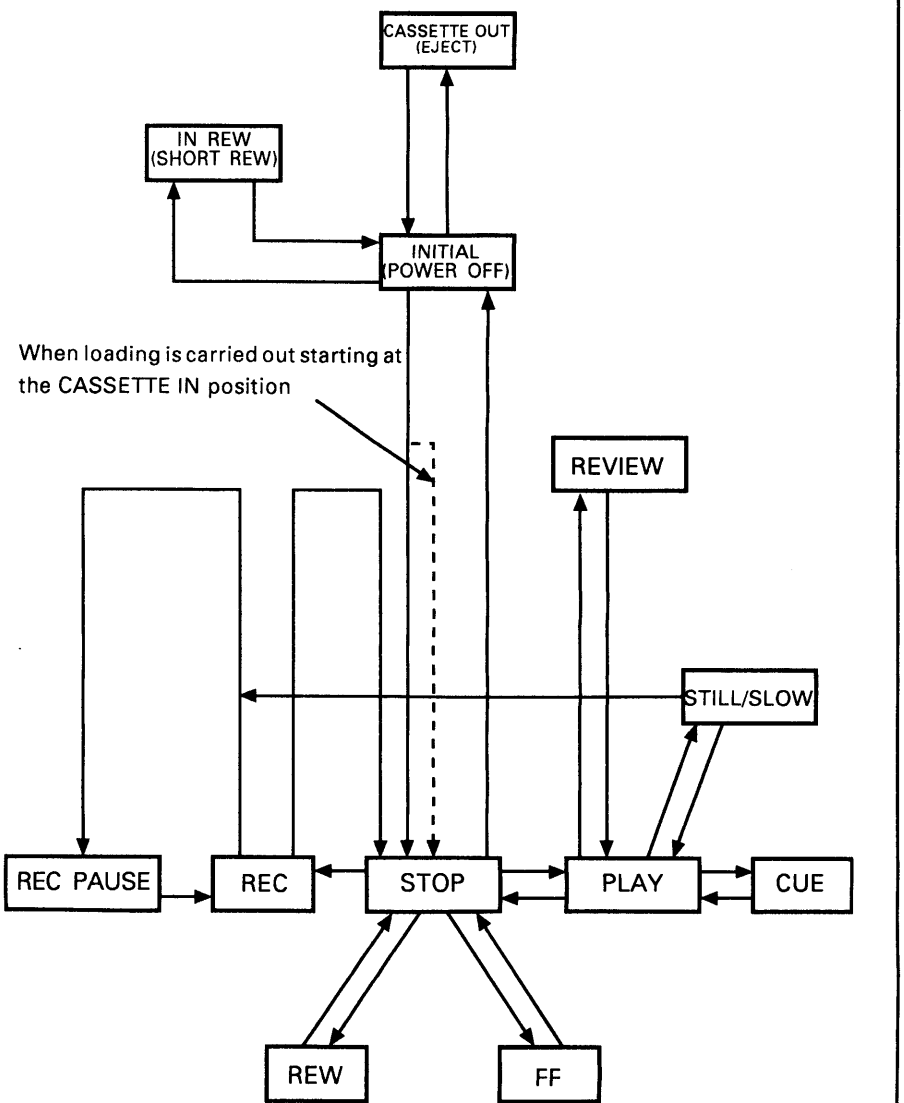
2-2. AN OVERVIEW OF THE MECHANISM MODES

2-2-1. MECHANISM MODE SWITCHING TABLE

NOTE: The letters and figures enclosed in circles in the mechanism mode column are the codes on the crescent slide.

HEX DATA	Mechanism mode
6	EJECT Ⓔ Distinguished by whether the EP switch is ON or OFF. Horizontal shift section.
2	Vertical shift section.
6	IN REW Ⓡ
0	
7	INITIAL ⑦
0	Cleaner roller assembly: ON
1	S/T mounting incline assembly pressure begins.
0	S/T mounting incline assembly pressure ends.
1	REVIEW ①
0	
2	IDLER pos. ② (Pinch roller OFF)
0	
3	STILL/SLOW ③
0	
5	PLAY/STOP ⑤
0	
4	BRAKE pos. ④
0	
6	FF/REW ⑥

The principal mode-switching states of the mechanism



MODE SWITCH OUTPUT TABLE

HEX DATA	SW DATA 1	SW DATA X	SW DATA Y	SW DATA Z	SW DATA 2
0	5.0V	H	H	H	5V
1	5.0V	H	H	L	0V
2	2.5V	H	L	H	5V
3	2.5V	H	L	L	0V
4	3.4V	L	H	H	5V
5	3.4V	L	H	L	0V
6	2.0V	L	L	H	5V
7	2.0V	L	L	L	0V

APPEARANCE OF MODE SWITCH AND RELATIONSHIP BETWEEN MODE POSITIONS

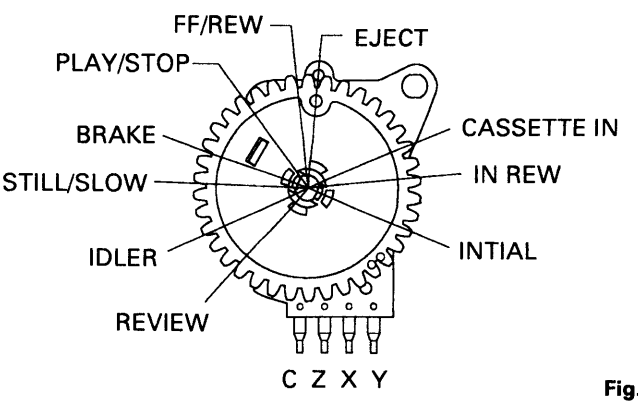


Fig.2-2-1

2-2-2. MOVEMENT CHECK LIST FOR THE MAIN PARTS OF THE MECHANISM

(S): Strength (W): Weakness

Mechanism mode / Principal parts	EJECT	IN REW	INITIAL (POWER OFF)	(LOADING)	(UNLOADING)	REV	IDLER	STILL/SLOW	PLAY/STOP	BRAKE	FF/REW	
T brake assembly	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON/OFF	
S brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON/OFF	
T soft brake assembly	OFF	OFF	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	
S soft lever	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	
BT lever assembly	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	
BT spring	OFF	OFF	OFF	OFF	OFF	ON(W)	ON(W)	ON(S)	ON(S)	ON(S)	ON(W)	
Pinch roller lever assembly	UP	UP	UP	UP/ DOWN	DOWN/ UP	ON	OFF	ON	ON	OFF	OFF	
Clutch mounting assembly	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	FF	
Load lever assembly	UNLO	UNLO	LO	LO	LO	LO	LO	LO	LO	LO	LO	
Capstan brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	
S and T incline mounting assembly				LO	UNLO							
Cleaner roller assembly	OFF	OFF	OFF	(ON)	(ON)	OFF	OFF	OFF	OFF	OFF	OFF	

2-2-3. HOW TO CHECK THE MECHANISM MODE POSITION

You can tell which mode the mechanism is currently in by looking at the codes and marking-lines on the crescent slide on the underside of the mechanism chassis. The edge of the crescent mounting is used as the reference line, as shown in Fig.2-2-2, and the marking-lines and symbols indicating the mechanism modes are displayed on the crescent slide, which slides against the edge of the crescent mounting. The mechanism mode is read off from the marking-line on the slide crescent which is aligned with the reference-line on the crescent mounting.

Example: In Fig.2-2-2, marking-line 6 is aligned with the reference-line on the crescent mounting, so the mechanism is seen to be in FF/REW mode.

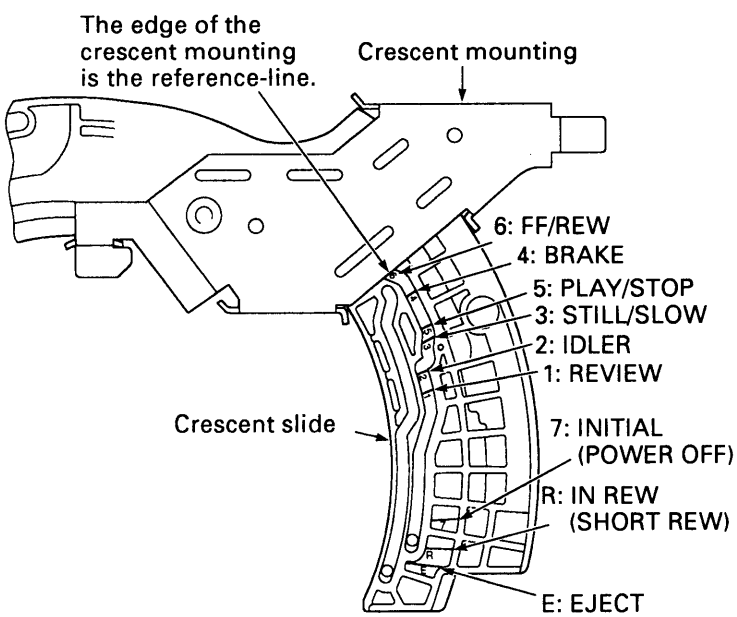


Fig.2-2-2

2-2-4. SELF-DIAGNOSIS DISPLAY

Some models are equipped with the SELF-DIAGNOSIS DISPLAYS function.

Use it as a means of finding out the symptoms and cause of the error before performing repairs.

For details, refer to the separate service manual for the respective models.

3. DISASSEMBLING THE MAIN PARTS OF THE MECHANISM

POINTS TO NOTE

- When fitting the parts of the mechanism, refer to the "Assembly Notes", and proceed in the reverse of dis-assembly order.
- Dis-assembly and assembly should be carried out in EJECT mode unless a movement mode is explicitly specified. EJECT mode is the state in which the cassette tape has been ejected.
- Clamps are used to prevent parts coming loose. When removing a clamp, be careful not to force it, as this can result in damage.

3-1. HOW TO MAKE THE MECHANISM MOVE

In order to check a movement such as front loading, front unloading, tape loading, tape unloading, raising/lowering and pressing the pinch roller, you will need to operate the loading motor. There are two methods of operating the loading motor, and these are explained in sections 3-1-1 and 3-1-2. The above movements can also be performed without operating the loading motor, by following the method explained in section 3-1-3.

3-1-1. HOW TO OPERATE THE LOADING MOTOR USING A DC VOLTAGE SUPPLY (See Fig.3-1-1)

1) Remove the power plug from the socket.
2) Remove the top cover, front cabinet assembly and bottom cover.
3) Supply a DC voltage in the range 5V between the MOTOR (+) wire and the MOTOR (–) wire on the CP-1 PWB assembly. To make the loading motor rotate in the PLAY or FF/REW direction, the positive terminal should be connected to the MOTOR (+) wire, and the negative terminal to the MOTOR (–) wire. To make it rotate in the EJECT direction, connect the positive terminal to the MOTOR (–) wire, and the negative terminal to the MOTOR (+) wire.
   When rotating the loading motor in the EJECT direction with a tape slacken, stop the rotation of the loading motor before beginning front unloading.
   Rotate the capstan motor with your hand, wind the slacked part of the tape, and rotate the loading motor in the EJECT direction again.

NOTE 1: When carrying out front loading, release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ of the cassette mechanism assembly (shown in Fig.3-2-2) in the direction of the arrow.

NOTE 2: When the loading motor stops rotating, following the completion of an operation such as tape loading or front unloading, switch off the DC voltage supply.

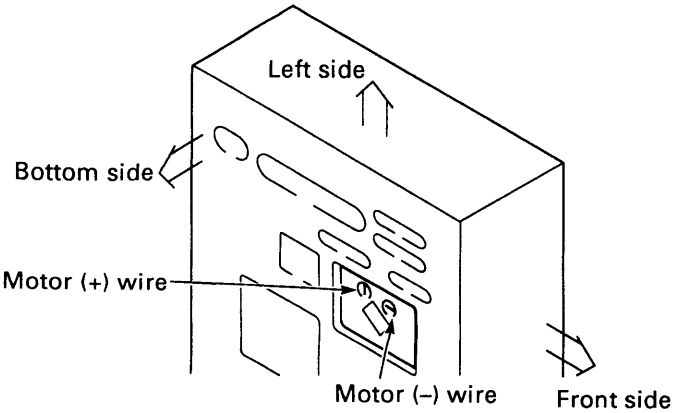


Fig.3-1-1

3-1-2. OPERATING THE LOADING MOTOR BY THE MANUAL METHOD (See Fig.3-1-2)

1) Refer to section 3-2 and install the mechanism unit.
2) Using your finger, turn the loading motor located at the rear of the mechanism unit. For EJECT, turn the loading motor in the direction of the arrow on the loading motor. For PLAY or FF/REW, turn it in the opposite direction.
   When rotating the loading motor in the EJECT direction with a tape slacken, stop the rotation of the loading motor before beginning front unloading.
   Rotate the capstan motor with your hand, wind the slacked part of the tape, and rotate the loading motor in the EJECT direction again.
   When carrying out front loading, release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ of the cassette mechanism assembly (shown in Fig.3-2-2).

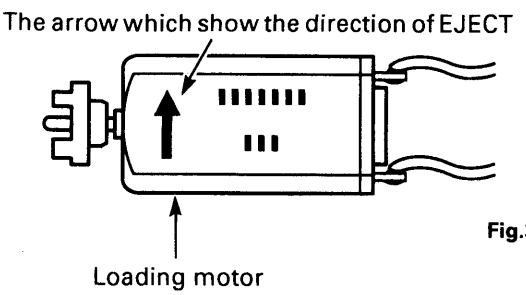


Fig.3-1-2

3-1-3. MAKING THE MECHANISM MOVE USING THE MANUAL METHOD

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-15 and remove the gear wheel 2.
3) If you turn the main cam anticlockwise, the mechanism will switch to a mode such as PLAY or FF/REW. To switch from FF/REW mode to EJECT mode, turn the main cam clockwise.

3-2. MECHANISM UNIT (See Figs. 3-2-1 and 3-2-2)

1) Remove the top cover, bottom cover and front cabinet assembly.
2) Unplug the flat cable ① from the VM-1/VP-1 PWB assembly on the cylinder (drum), and unplug the ACE head connector ③.
3) Remove the screw ②, the two screws ④, then remove the VM-1/VP-1 PWB assembly ⑤, lifting it upwards. The shape of the VM-1/VP-1 PWB assembly and the bracket varies according to the model.
4) Remove the four screws ⑥ and the two screws ⑩, then lift up the mechanism unit. The tray ⑦ will stop you removing the two screws ⑥ on the front, so release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ shown in Fig.3-2-2, then slide off the tray ⑦. Move the tray by referring to section 3-1 and turn the loading motor in the PLAY direction.

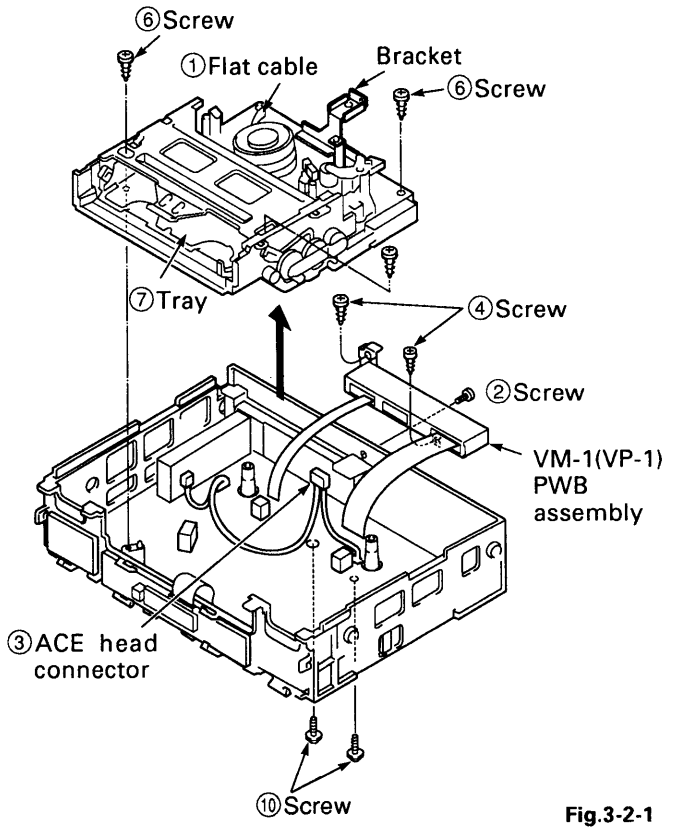


Fig.3-2-1

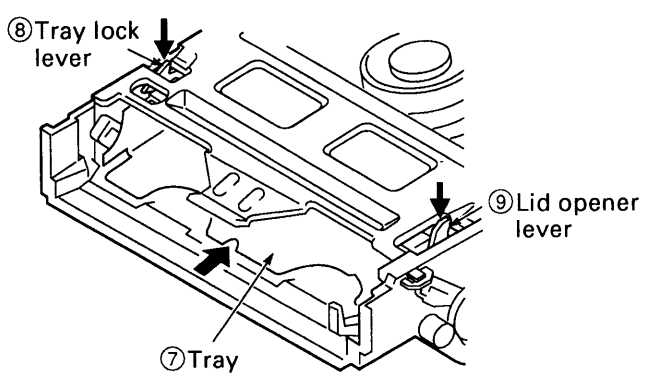


Fig.3-2-2

3-3. CASSETTE DRIVE MECHANISM

3-3-1. CASSETTE MECHANISM ASSEMBLY (See Figs.3-3-1 and 3-3-2)

1) Put the VCR into EJECT mode.
2) Remove the two screws ①.
3) Lift up the back of the cassette mechanism assembly ② slightly, and remove the two hooks ③ on the front.

ASSEMBLY NOTES:

1. The cassette mechanism assembly and the mechanism chassis should both be fitted in EJECT mode.
2. Check that the two hooks ③ have snapped into the mechanism chassis, and make sure that the two holes ④ in the cassette mechanism assembly are aligned with the two dowels ⑤ on the mechanism chassis.
3. Make sure that the big tooth on the pinion gear of the cassette mechanism assembly slots properly into the deepest gap in the start rack gear, as shown in Fig.3-3-2.
4. When fitting the two screws ①, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 5 kg/cm.

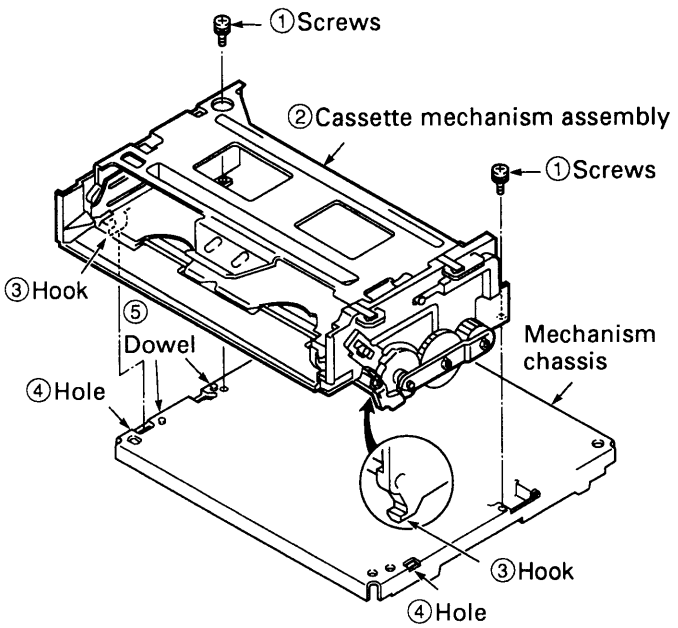


Fig.3-3-1

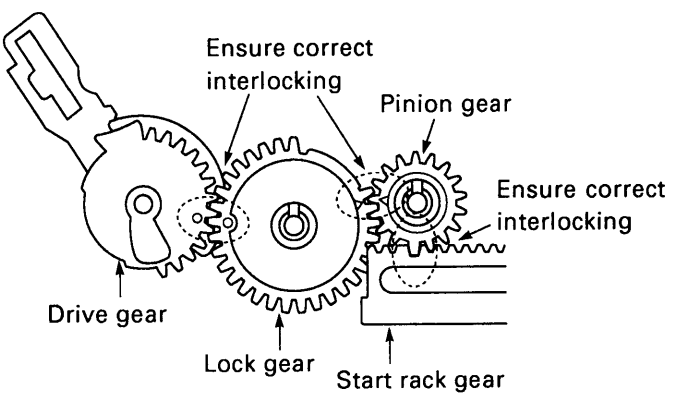


Fig.3-3-2

3-3-2. CASSETTE DRIVE GEAR (See Fig.3-3-3)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove clamps ① and ②, then remove the gear holder ③.
3) Remove the clamp ①, then remove the pinion gear ④.
4) Remove the clamp ②, then remove the lock gear ⑤.

ASSEMBLY NOTES:

1. Put the tray in the EJECT mode position before fitting any parts.
2. Apply grease (VHJ-0100) to the gear mounting shafts, all the gear teeth, and the cam part of the drive gear ⑥.
3. Ensure that the drive gear, the lock gear and the pinion gear interlock correctly, as shown in Fig.3-3-2.
4. Make sure the clamps ① and ② snap in to the gear holder ③.

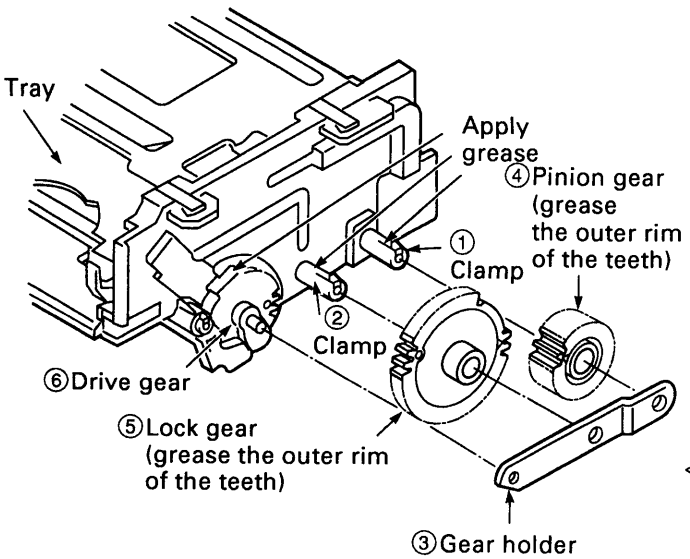


Fig.3-3-3

3-3-3. DOOR OPENER, UNDER FRAME AND STAND L (See Fig.3-3-4)

1) Remove the cassette mechanism assembly, referring to section 3-1.
2) Remove the two clamps ① and take out the under frame ②, pulling it towards you.
3) Press down the tray lock lever ③ and the lid opener lever ④, and loosen the tray ⑤, lifting it away from you. In this state, press the clamp ⑥ and remove the door opener lever ⑦.
4) Remove the two clamps ⑧ and take out the stand L ⑨. Be careful not to exert too much force on the clamps ⑧, as this could cause damage.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the grooves ⑪ on the stand L, the inside of the hole ⑬ in the drive shaft ⑫, and the mounting hole ⑭ in the door opener lever of the stand R.
2. Before fitting the stand L ⑨, be sure to move the tray ⑤ back as far as the EJECT mode position. Put the two pins ⑩ on the tray ⑤ into the grooves ⑪ on the stand L. Put the drive shaft ⑫ into the hole ⑬.
3. Be sure to fasten the two clamps ① and the clamp ⑥ on the stand R, and to fasten the two clamps ⑧ on the stand L.

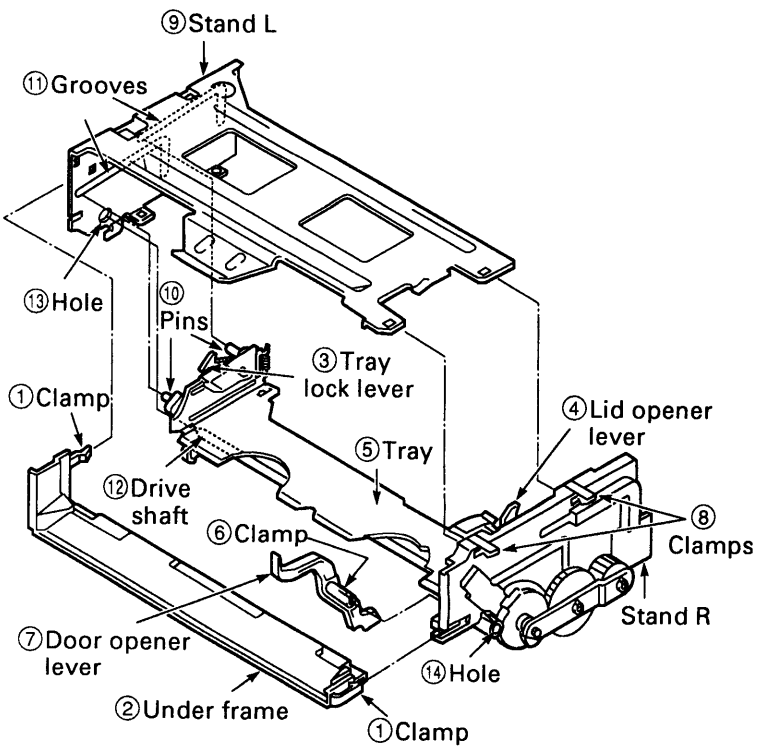


Fig.3-3-4

3-3-4. START RACK GEAR AND FRONT RACK GEAR (See Figs.3-3-5 and 3-3-6)

1) Remove the mechanism unit, referring to section 3-2.
2) Remove the cassette mechanism assembly, referring to section 3-3-1.
3) Remove the special screw ①. When you do this, slide the front rack gear assembly ② towards the front until it stops, then take it off the shaft ③. Take care not to damage the shaft ③.
4) Remove the spring ④.
5) Remove the clamp ⑥ on the front rack gear ⑤, then remove the start rack gear ⑦.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the front rack gear ⑤ and all over the inside of the groove on the start rack gear ⑦.
2. Align the positioning mark ⑧ on the front rack gear ⑤ with the mark ⑩ on the main cam ⑨.
3. When installing the cassette mechanism assembly, refer to section 3-3-1 and align the start rack gear with the pinion gear.

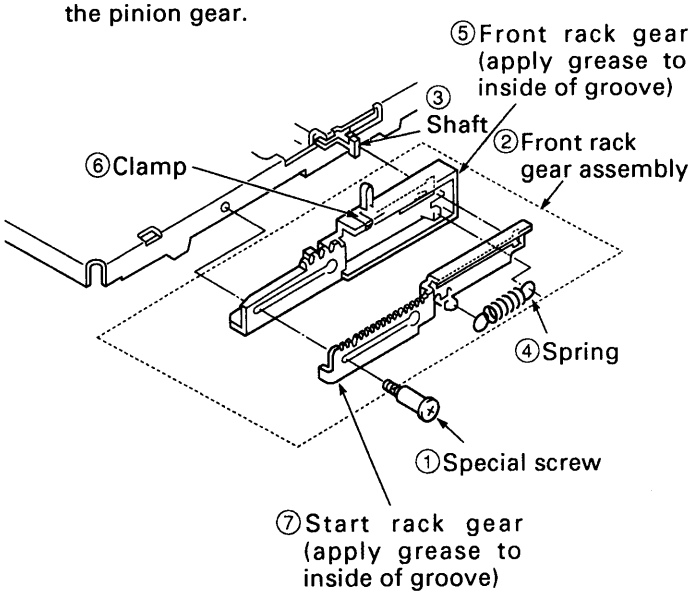

⑤Front rack gear (apply grease to inside of groove)
③ Shaft
②Front rack gear assembly
⑥Clamp
④Spring
①Special screw
⑦Start rack gear (apply grease to inside of groove)

Fig.3-3-5

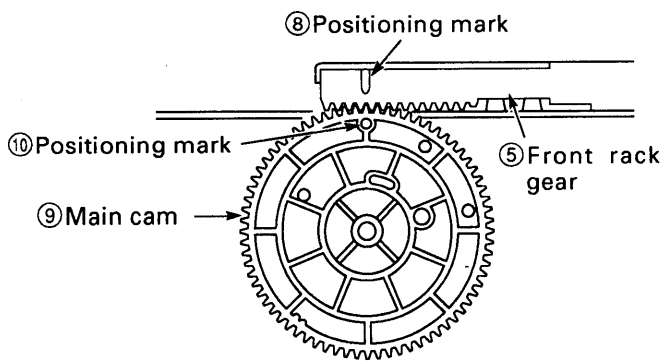


Fig.3-3-6

3-4. CLEANER ROLLER ASSEMBLY (See Fig.3-4-1)

1) Remove the clamp ① and take out the cleaner lever ②. When you do this, be careful not to bend the plastic springs Ⓐ and Ⓑ on the cleaner lever ②.
2) Remove the clamp ③, and take out the cleaner roller assembly ④. Be careful not to touch the sponge on the cleaner roller assembly ④.

ASSEMBLY NOTES:

1. When mounting the cleaner lever ② on the shaft ⑤, press the clamp ① in the direction shown by the arrow, and snap it into the mounting ⑥ on the audio R/P head assembly.

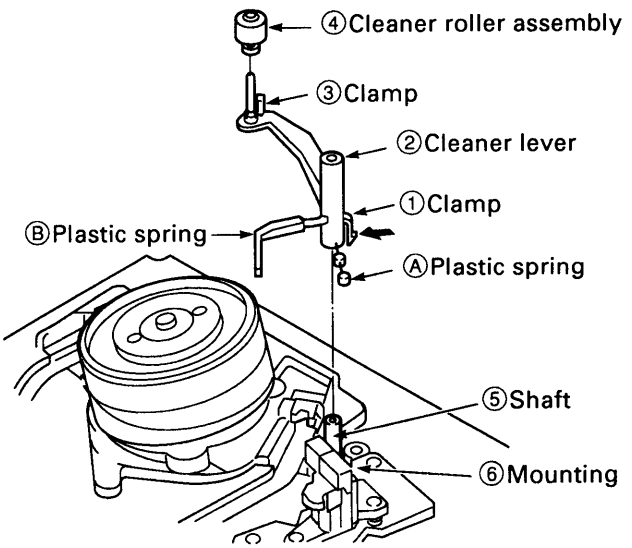


Fig.3-4-1

3-5. CYLINDER (DRUM)

3-5-1. UPPER CYLINDER ASSEMBLY (UPPER DRUM) (See Figs. 3-5-1, 3-5-2, 3-5-3, 3-5-4)

There are two types of cylinders, one that can be disassembled into the upper cylinder (upper drum) and lower cylinder (lower drum) and one that cannot. For that type that cannot, replace the cylinder assembly as a whole.

1) Remove the two screws ① (See Fig.3-5-1).
2) First, tighten the handle② of the video head removing tool (VHJ-0041), then screw the two long screws ③ evenly into the two screw holes ⑤ in the upper cylinder assembly (upper drum) ④ (See Fig. 3-5-2).
3) Hold the tool (VHJ-0041) so that the upper cylinder assembly (upper drum) ④ does not rotate, and at the same time, turn the handle ② clockwise, and remove the upper cylinder assembly (upper drum) ④.
4) Remove the tool (VHJ-0041) from the upper cylinder assembly ④.

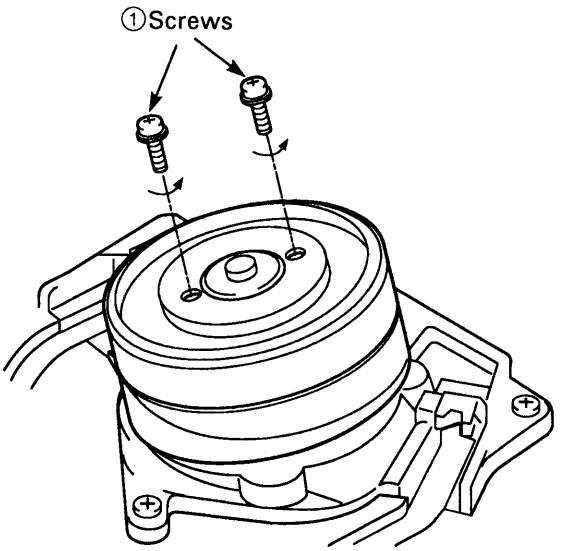


Fig.3-5-1

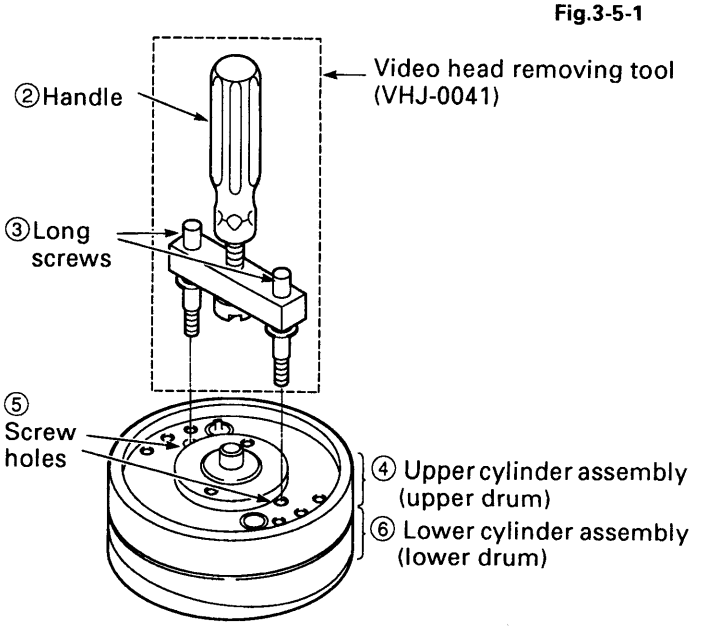


Fig.3-5-2

ASSEMBLY NOTES:

1. When carrying out assembly, the CH-1 head on the upper cylinder assembly (upper drum) ④ and the lower cylinder assembly (lower drum) ⑥ must be aligned. The CH-1 head on the upper cylinder assembly ④ bears a code ⑦ such as 2N2S-V, 2N4N, or 4H6N, as shown in Fig.3-5-3. The CH-1 on the lower cylinder assembly ⑥ has a round hole ⑧, as shown in Fig.3-5-4. Assemble the parts so that the round hole ⑧ is next to the code ⑦ on the upper cylinder assembly.
2. Be careful not to scratch the tape path surface of the cylinder. After replacing the cylinder, clean the tape path surface of the cylinder.
3. After replacing the upper cylinder assembly, do the tape path adjustment as instructed in section 4-3 and do the swithching position adjustment of the servo circuit.

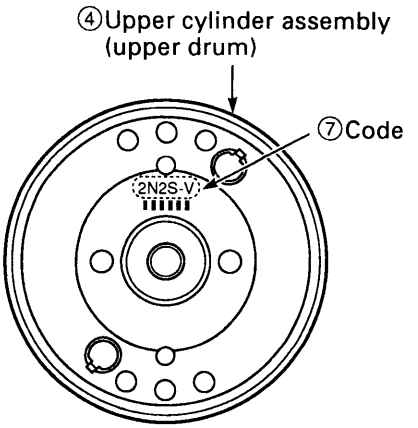
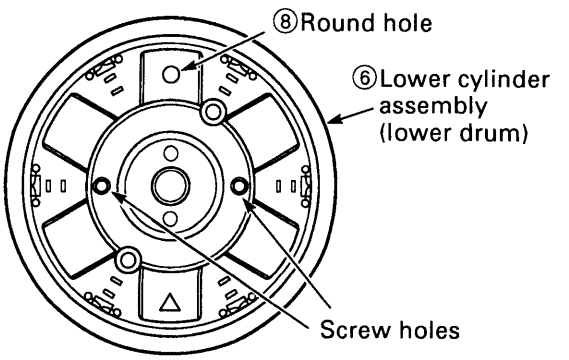


Fig.3-5-3

[EXCEPT FOR 2-HEAD MONAURAL MODELS]



[2-HEAD MONAURAL MODELS ONLY]

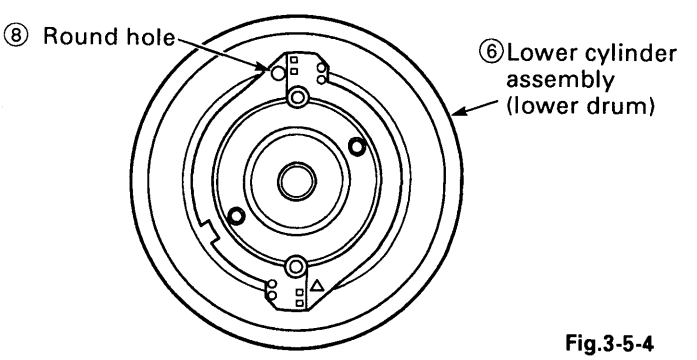


Fig.3-5-4

3-5-2. CYLINDER (DRUM) UNIT (See Fig.3-5-5)

1) Put the mechanism into EJECT mode.
2) Refer to section 3-2 and remove the VM-1/VP-1 PWB assembly
3) Refer to section 3-4 and remove the cleaner lever.
4) Remove the two screws ① and take off the bracket ②. The bracket shape varies according to the model.
5) Remove the three screws ③. Taking care not to scratch or soil the tape path surface of the cylinder (drum), lift the mounting cylinder ④ slightly, and keeping it raised.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rails (front and rear) of the cylinder mounting ④ (grease the parts which come in contact with the S and T incline mounting assembly).
2. Align the two dowels ⑥ on the mounting cylinder ④ with the two holes ⑦ on the mechanism chassis. Check that connector is inserted in the CP-1 PWB assembly.
3. After assembly, clean the tape path surface of the cylinder (drum).
4. After replacing the cylinder unit, do the tape path adjustment as instructed in section 4-3, and do the switching position adjustment of the servo circuit.

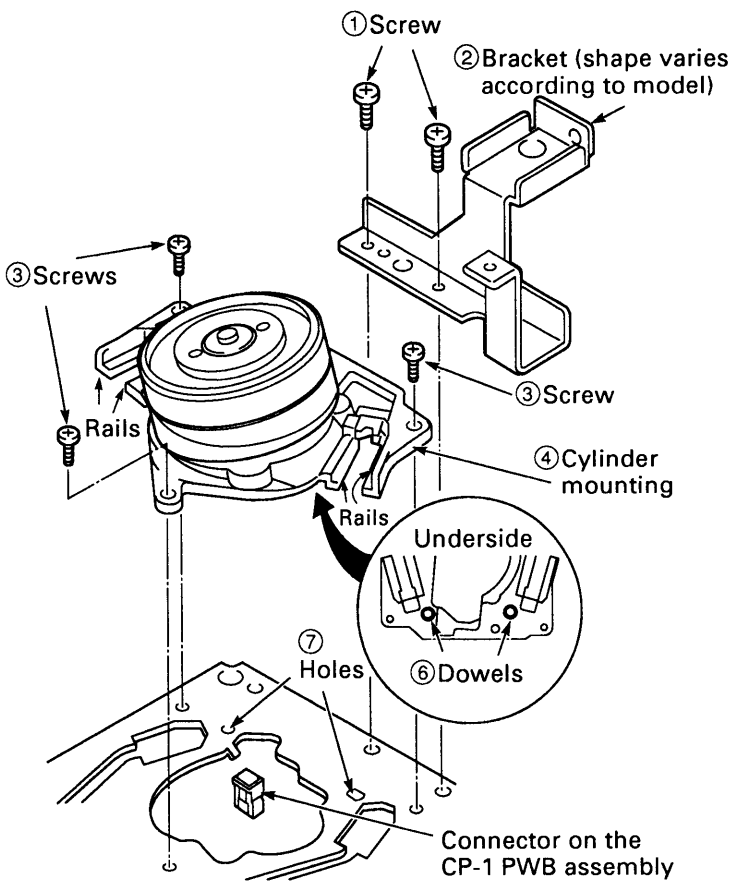


Fig.3-5-5

3-5-3. CYLINDER MOTOR (ROTOR AND STATOR) (See Fig.3-5-6)

1) Refer to section 3-5-2 and remove the cylinder unit.
2) If you have removed the mechanism unit, remove the screw ① and remove the cylinder earth assembly ②.
3) Remove the two screws ③, the rotor ④ and the spacer ⑧.
4) Remove the three screws ⑤ and the stator ⑥.

ASSEMBLY NOTES:

1. When fitting the rotor ④, align the long hole ⑨ -beside the triangular mark on the rotor ④ - with the hole ⑩ in the rotor disk.
2. When fitting the screws ③ and ⑤, use the torque gauge screwdriver (VHJ-0014). give the screws a tightening torque of 3 kg/cm.
3. Align the dowel ⑪ on the cylinder earth assembly ② with the hole ⑫ in the chassis.
4. If you have removed the cylinder unit, after assembly, do the tape path adjustment as instructed in section 4-3, and do the switching position adjustment of the servo circuit.

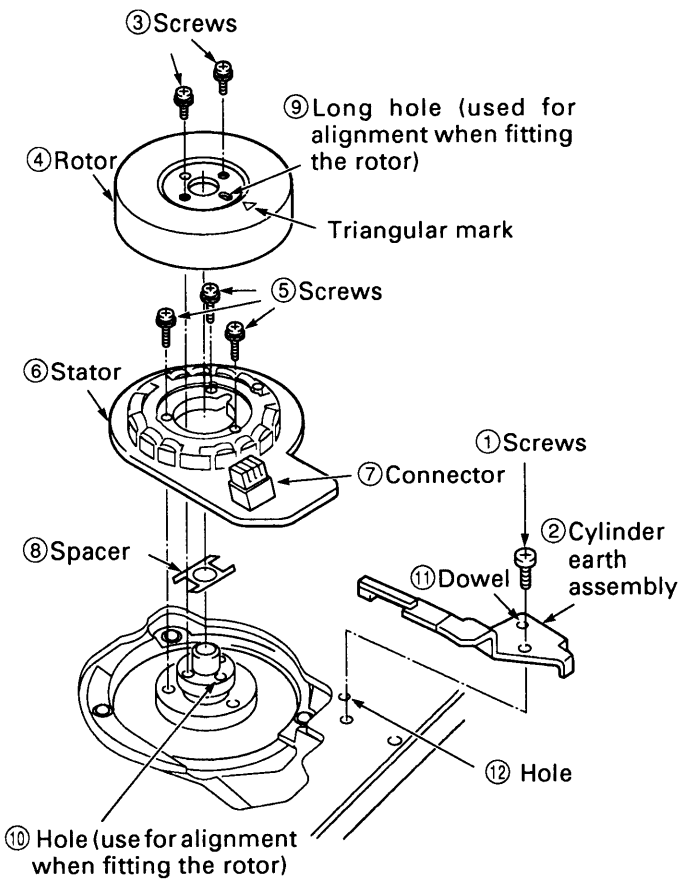


Fig.3-5-6

3-5-4. CYLINDER ASSEMBLY (See Fig.3-5-7)

1) Refer to sections 3-5-2 and 3-5-3, and remove the cylinder unit, the rotor, and the stator.
2) Remove the three screws① and the cylinder assembly ②.

ASSEMBLY NOTES:

1. Be careful not to scratch or soil the top of the cylinder. After fitting the cylinder, clean the surface.
2. Align the cylinder assembly ② with the two dowels ④ on the cylinder mounting ③.
3. After fitting the cylinder assembly, do the tape path adjustment as instructed in section 4-3 and do the switching position adjustment of the servo circuit.

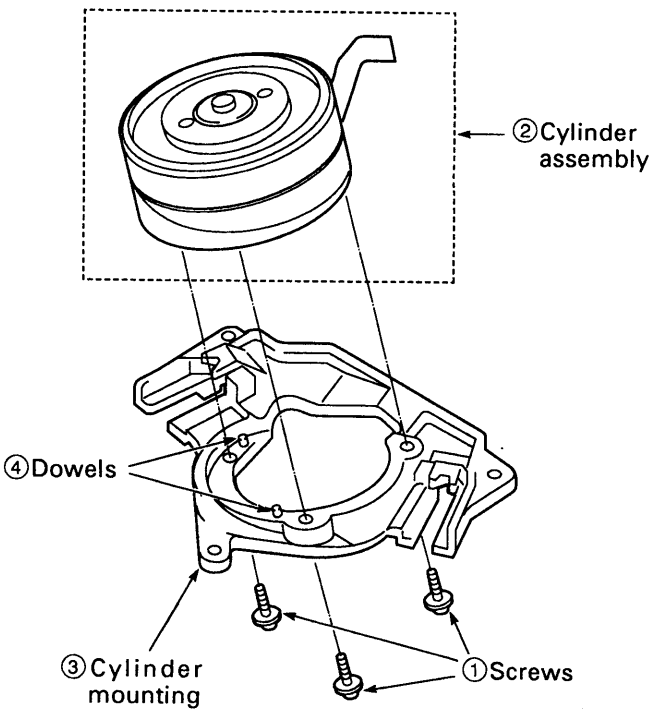


Fig.3-5-7

3-6. FE HEAD AND ACE HEAD

3-6-1. AUDIO R/P HEAD ASSEMBLY (ACE HEAD) (See Fig.3-6-1)

1) Unplug the connector from the audio R/P head assembly (ACE head).
2) Remove the two screws ① and the audio R/P head assembly (ACE head) ②.

ASSEMBLY NOTES:

1. Align the hole ③ on the audio R/P head assembly (ACE head) with the pin ④ on the chassis unit.
2. After assembly, check that the clamp ⑤ on the cleaner roller assembly has snapped into the mounting of the audio R/P head assembly (ACE head) ②.
3. After assembly, clean the surface of the head with a soft cloth or chamois.
4. After assembly, refer to section 4-3, and adjust the head height, the azimuth and the tracking (X) position.

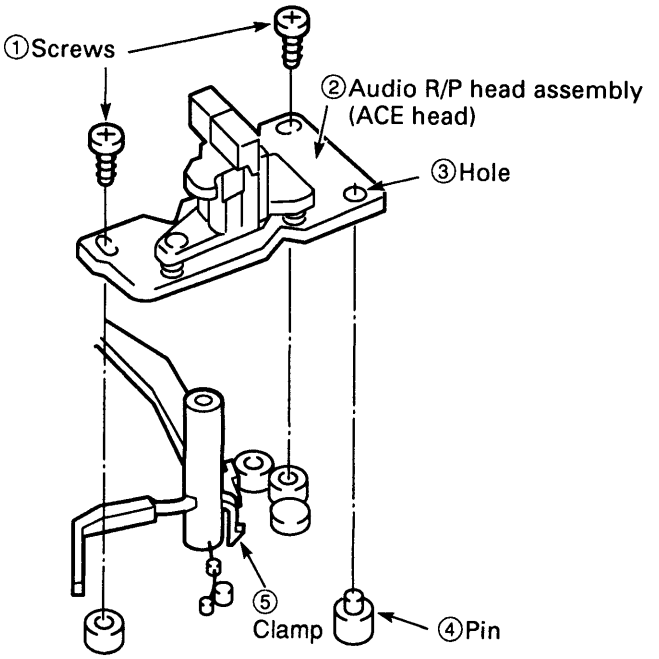


Fig.3-6-1

3-6-2. FULL ERASE HEAD (See Fig.3-6-2)

1) Unplug the connector from the full erase head ①.
2) Remove the screw ② and the full erase head ①.

ASSEMBLY NOTE:

1. After assembly, clean the full erase head ①.

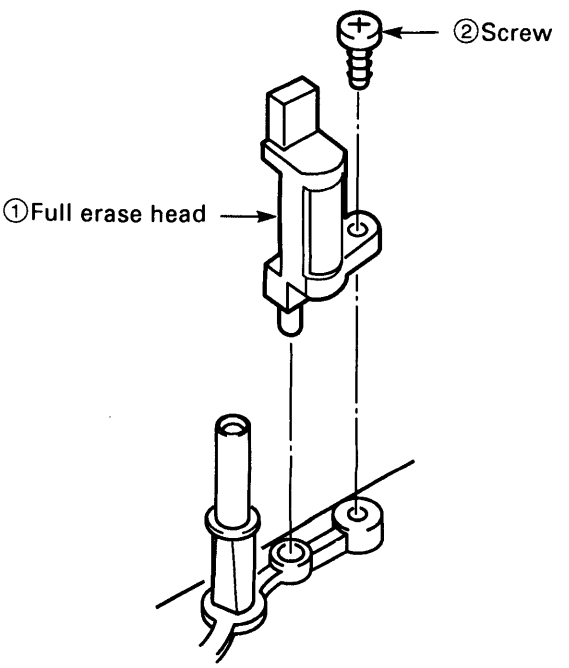


Fig.3-6-2

3-7. CAPSTAN MOTOR

3-7-1. CAPSTAN MOTOR (See Fig.3-7-1)

1) Refer to section 3-2, then remove the mechanism unit.
2) Remove the two screws ②, then remove the harness mounting ①.
3) Remove the reel belt ③.
4) Remove the three screws ⑤ and the capstan motor ⑥.

ASSEMBLY NOTES:

1. Check that connector ④ is inserted in the CP-1 PWB assembly.
2. When fitting the three screws ⑤, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 3.5 kg/cm.
3. After assembly, clean the capstan shaft with a soft cloth or chamois.

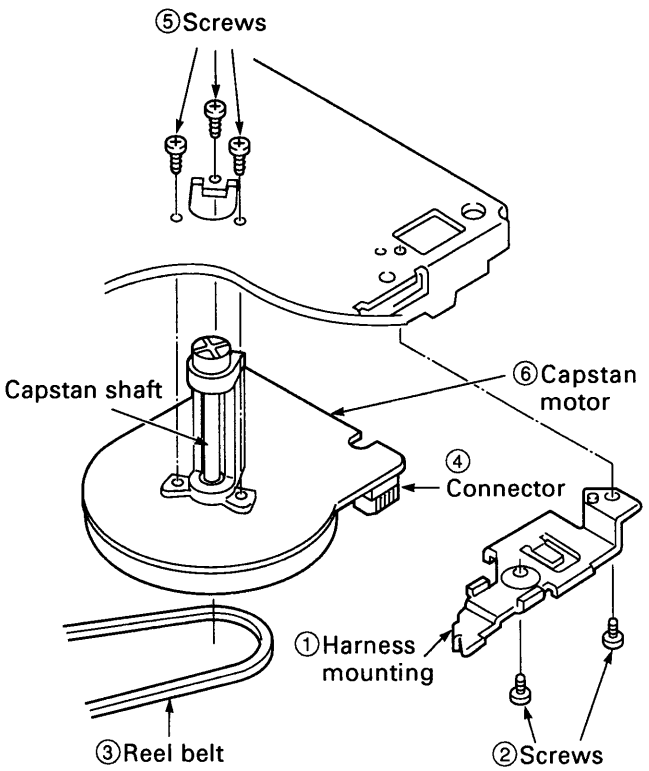


Fig. 3-7-1

3-7-2. CAPSTAN BRAKE ASSEMBLY (See Fig.3-7-2)

1) Remove the spring ①.
2) Remove the clamp ②, then remove the capstan brake assembly ③.

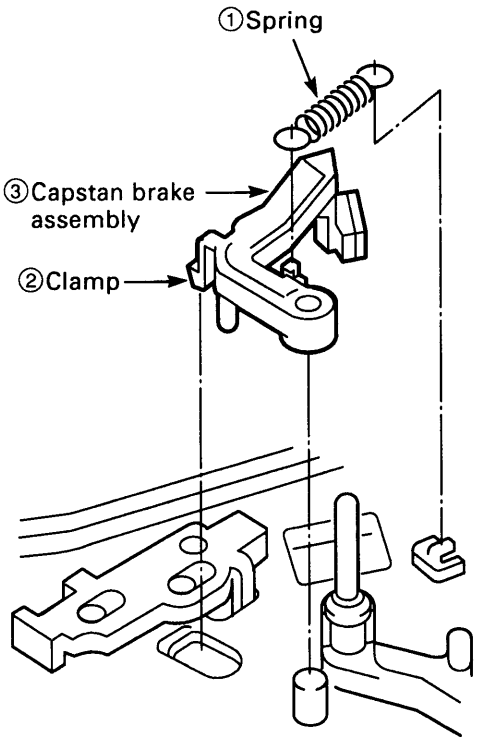


Fig.3-7-2

3-8. LOADING MOTOR ASSEMBLY AND WORM GEAR ASSEMBLY (See Fig.3-8-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the soldering on the lead wires② of the loading motor assembly from the MC-1 PWB assembly. When you do this, be careful not to let the soldering iron touch any other parts.
3) Press the clamp③, and remove the loading motor assembly① and the damper④. Be careful not to exert too much force on the clamp③.
4) Remove the worm gear assembly⑤. To maintain performance, do not dis-assemble the worm gear assembly⑤.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0010) to the teeth of the worm gear assembly.
2. Check that the clamps③ and⑥ are securing the loading motor assembly.
3. Check the polarity of the lead wires② (the orange wire is the positive terminal, and the gray wire is the negative terminal). After soldering the lead wires②, adjust them so that they do not touch the friction gear assembly.

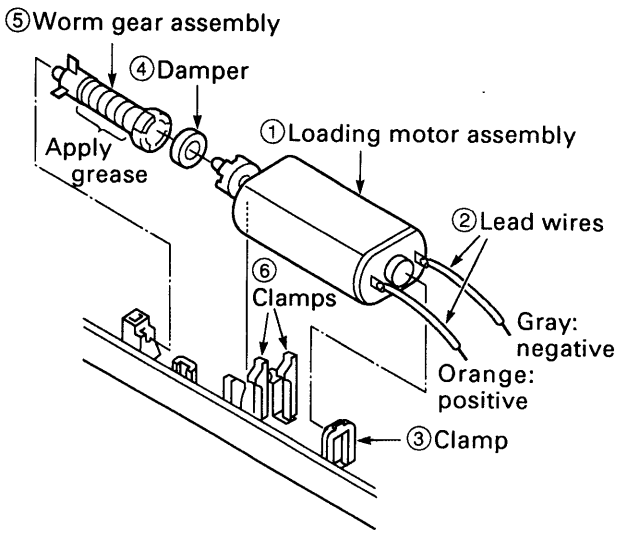


Fig.3-8-1

3-9. PINCH ROLLER PRESSURE MECHANISM

3-9-1. PINCH ROLLER LEVER ASSEMBLY (See Fig.3-9-1)

1) Remove the clamp ①, then remove the pinch lift mounting②.
2) Remove the spring③, then remove the pinch roller lever assembly④ off the pinch lift mounting②. Before you do this, align the Indentation⑤ on the pinch roller lever assembly④ with the clamp⑥ on the pinch lift mounting②.

ASSEMBLY NOTE:

1. Be careful to keep the surface of the pinch roller free of dust and dirt.

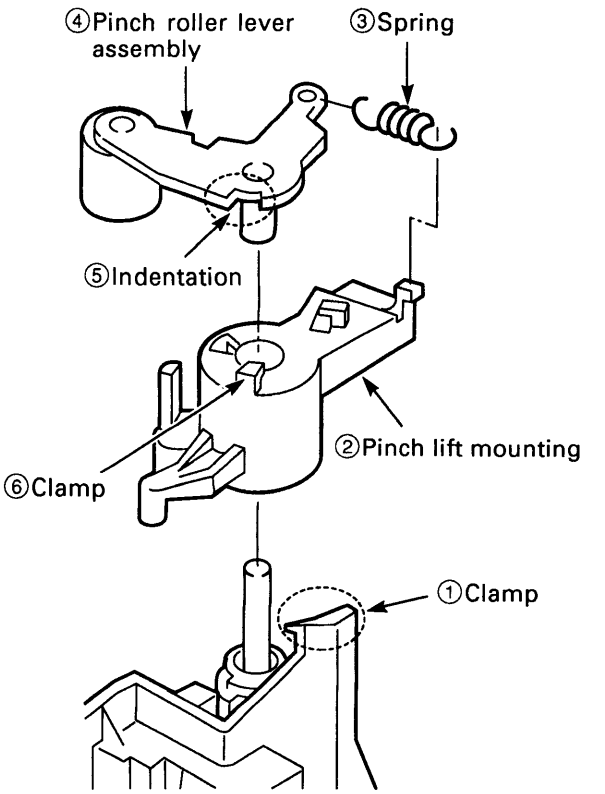


Fig.3-9-1

3-9-2. PINCH LIFT CAM AND PINCH CAM GEAR (See Figs.3-9-2 and 3-9-3)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-9-1 and remove the pinch roller lever assembly.
3) After removing the screw ①, undo the three clamps ②, then remove the opener mounting ③.
4) Remove the clamp ④ and the pinch lift cam ⑤.
5) Remove the pinch cam gear ⑥.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) around the shaft ⑦, all over the teeth Ⓑ of the pinch cam gear ⑥, all over the teeth of the pinch lift cam ⑤, all over the cam grooves Ⓐ, and all over the "V Part Ⓒ" of the opener mounting ③. Apply grease (VHJ-0101) to the outside of the shaft ⑧ and all over the top cam Ⓓ of the pinch cam gear ⑥.
2. Check that the positioning mark ⑩ on the mode switch ⑨ is aligned with the arrow ⑪ on the MC-1 PWB assembly, as shown in Fig.3-9-3. Then align the triangular mark ⑫ on the pinch cam gear ⑥ with the arrow ⑪ on the MC-1 PWB assembly. After that, align the round hole ⑬ on the pinch lift cam ⑤ with the indentation ⑭ on the pinch cam gear ⑥.
   If you have carried out the above alignments and the pinch roller will still not move up and down or perform the pressing movement correctly, refer to section 3-15 and check the alignment of the gear wheels 1 and 2, the main cam, and the mode switch.

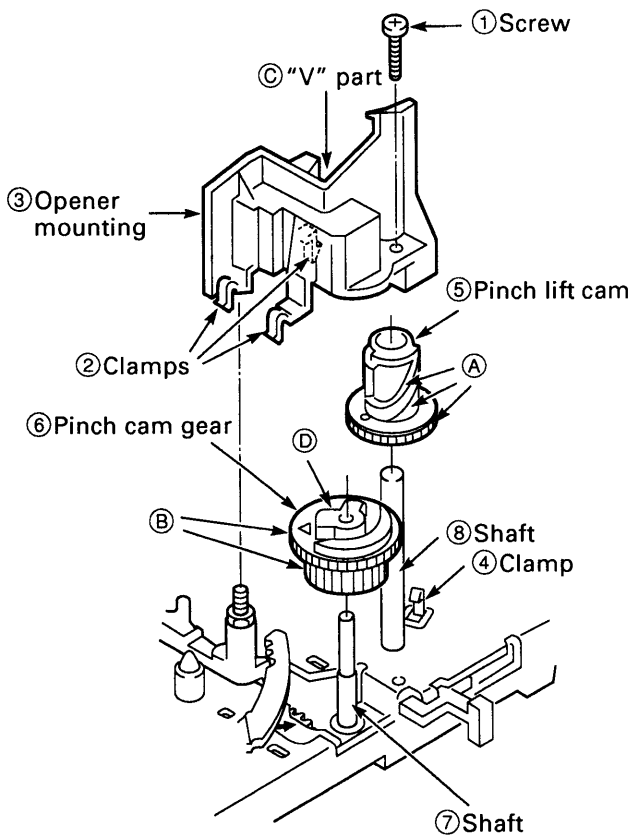


Fig.3-9-2

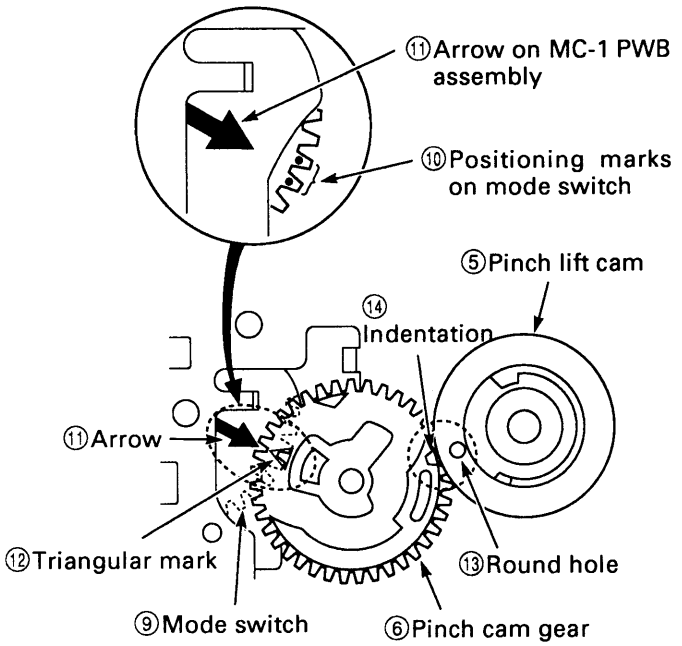


Fig.3-9-3

3-10. L GUIDE LEVER ASSEMBLY AND LOAD LEVER ASSEMBLY (See Figs.3-10-1)

1) Refer to section 3-3 and remove the cassette mechanism assembly.
2) Refer to sections 3-9-1 and 3-9-2, then remove the pinch roller lever assembly and the opener mounting.
3) After removing the washer ④, remove the L guide act lever assembly ⑤.
4) Remove the special nut ⑥, then remove the load lever assembly ⑦ and the L guide lever spring ⑧.

ASSEMBLY NOTES:

1) Apply grease (VHJ-0100) to the toothed area Ⓐ of the L guide act lever assembly ⑤ and around the shafts ⑨ and ⑩.
2) Refer to section 4-3 and adjust the height of the load lever assembly.
3) Hook the L guide lever spring ⑧ into the stopper ⑬ and load lever assembly ⑦ shown in Fig. A.
4) Put the pin ⑪ of the L guide act lever assembly into the cam groove ⑫ of the crescent slide.

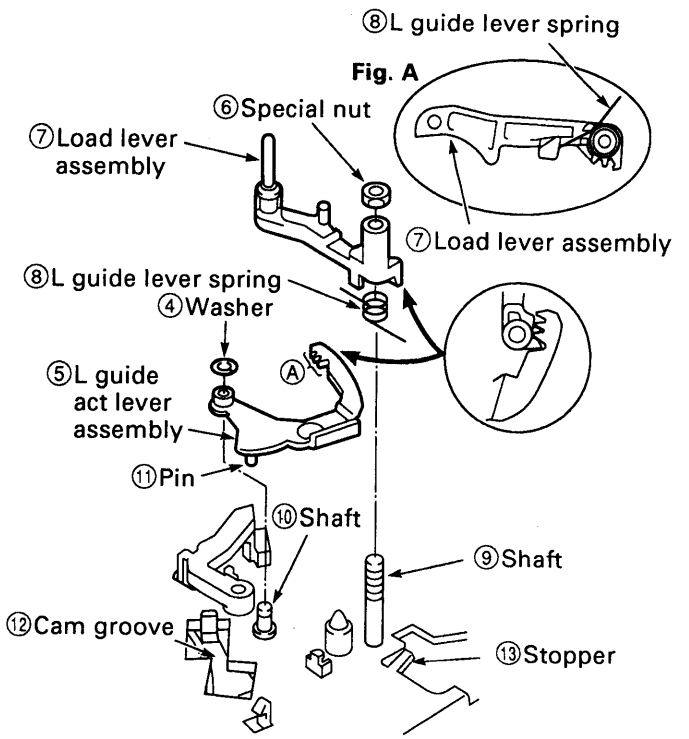


Fig.3-10-1

3-11. BT LEVER ASSEMBLY (See Fig.3-11-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Remove the BT spring ①.
4) Remove the clamp ② on the underside of the mechanism chassis, then remove the BT lever assembly ③.
5) Remove the clamp ⑤ on the band brake assembly ④. Then, as shown in Fig. A, align the other end of the band brake assembly with the protruding parts of the BT lever assembly ③ before removing it.

ASSEMBLY NOTES:

1. When fitting the BT lever assembly ③, be careful not to bend the stopper ⑥ or the S incline mounting assembly ⑦ out of shape by knocking it against them.
2. Hook the long hook of the BT spring ① into the BT lever assembly ③, as shown in Fig. B.
3. After assembly, make sure that the mountings on both ends of the band brake assembly ④ are positioned as shown in Fig. C.
4. After assembly, refer to section 4-2-1, and make the appropriate adjustment.

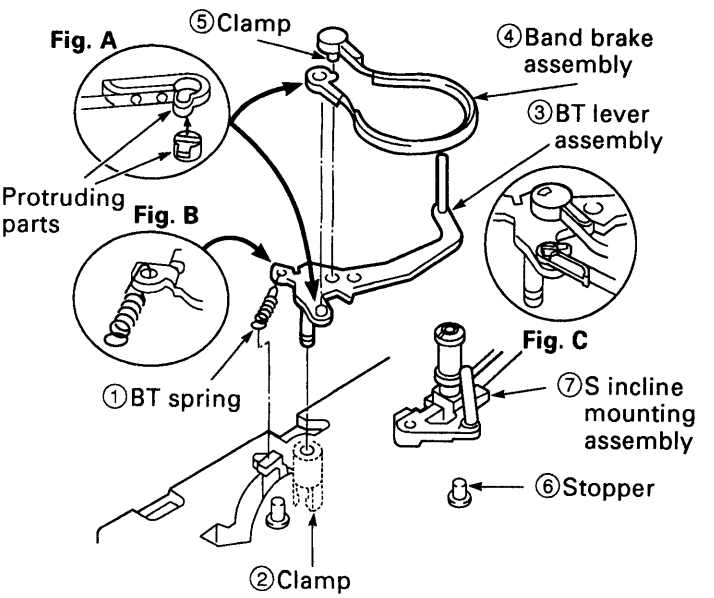


Fig.3-11-1

3-12. REEL DRIVE MECHANISM

3-12-1. REEL BELT, REEL PULLEY, FRICTION GEAR ASSEMBLY AND CLUTCH CHANGE LEVER (See Fig.3-12-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the reel belt ① from the reel pulley ②.
3) Take off the washer ③ and remove the reel pulley ②.
4) Take off the washer ④ and remove the friction gear assembly ⑤.
5) Remove the clutch change spring ⑥.
6) remove the clamp ⑦ gripping the top of the mechanism chassis, then remove the clutch change lever ⑧.

ASSEMBLY NOTES:

1. After cleaning the shafts ⑨ and ⑩, apply a drop of oil (VHJ-0099) to each.
2. Be careful not to get any grease on the reel belt ①.

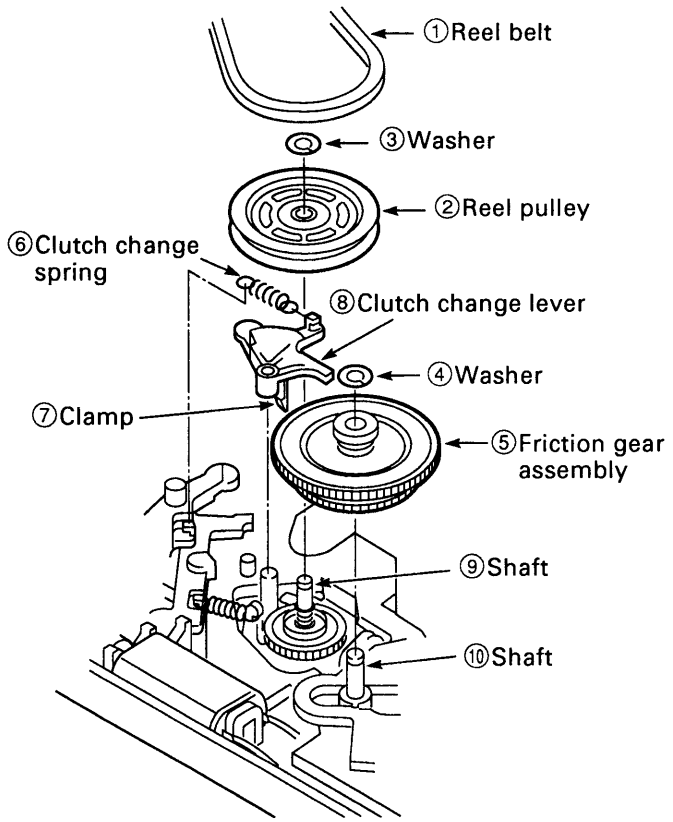


Fig.3-12-1

3-12-2. CLUTCH MOUNTING ASSEMBLY (See Fig.3-12-2)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Refer to section 3-12-1 and remove the reel pulley.
3) Remove the two screws ①, then remove the clutch mounting assembly ②.

ASSEMBLY NOTES:

1. Align the two holes ③ with the shafts ④ and ⑤. Be careful not to press part A of the clutch mounting assembly ② against the band brake assembly.
2. After assembly, make sure that the clamp on the clutch change lever has snapped into the chassis.

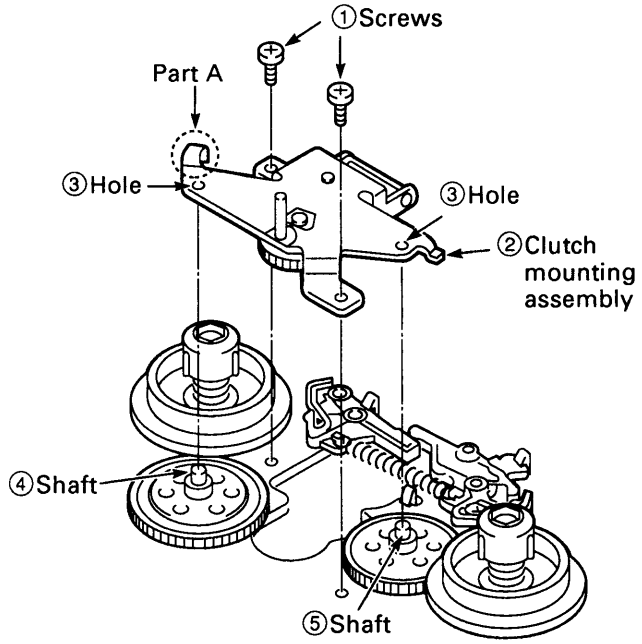


Fig.3-12-2

3-12-3. S SOFT LEVER, SUPPLY REEL ASSEMBLY AND S REEL GEAR (See Fig.3-12-3)

1) Remove the S soft spring ①.
2) Remove the clamp ②, then remove the S soft lever ③.
3) Refer to section 3-12-2 and remove the clutch mounting assembly.
4) Refer to section 3-11 and remove the band brake assembly, then remove the supply reel assembly ④ and the S reel gear ⑤.

ASSEMBLY NOTES:

1. After cleaning the shafts ⑥ and ⑦, apply a drop of oil (VHJ-0099) to each.
2. After assembly, clean the side of the supply reel assembly ④.

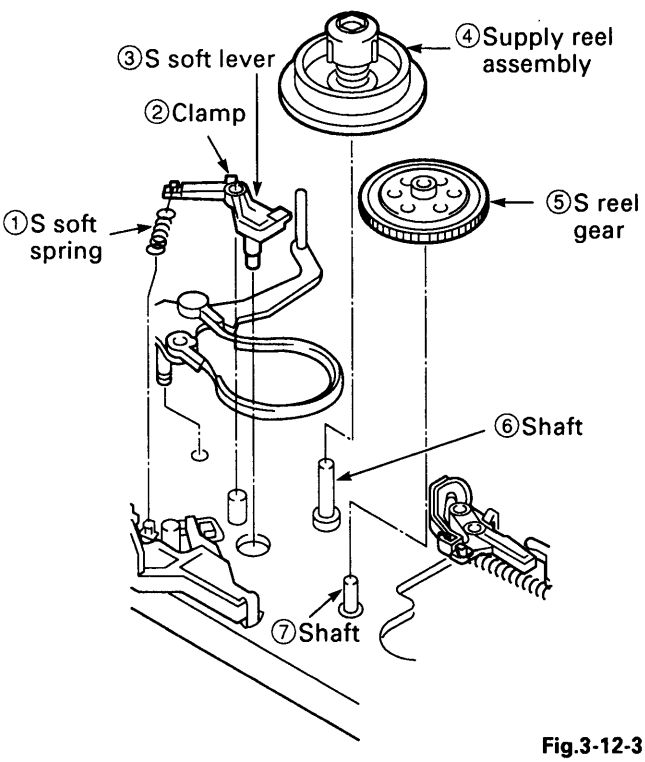


Fig.3-12-3

3-12-4. T SOFT BRAKE ASSEMBLY, TAKE UP REEL ASSEMBLY, T REEL GEAR (See Fig.3-12-4)

1) Remove the T soft spring ①.
2) Remove the clamp ②, then remove the T soft brake assembly ③.
3) Refer to section 3-12-2 and remove the clutch mounting assembly.
4) Pressing the T brake assembly ④ in the direction of the arrow, remove the take up reel assembly ⑤ and the T reel gear ⑥.

ASSEMBLY NOTE:

1. After cleaning the shafts ⑦ and ⑧, apply a drop of oil (VHJ-0099) to each.

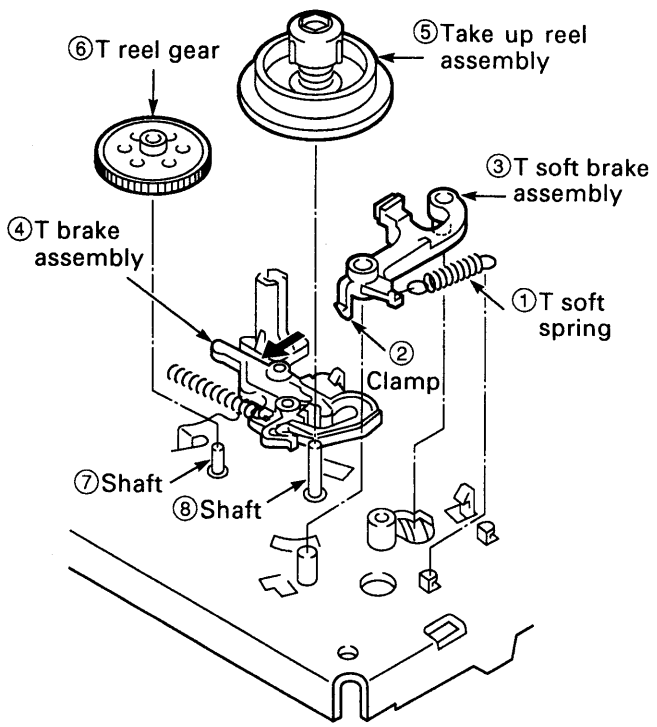


Fig.3-12-4

3-13. BRAKES

3-13-1. S BRAKE ASSEMBLY, T BRAKE ASSEMBLY, T BRAKE ACT SLIDE (See Fig.3-13-1)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove the two clamps ①, then remove the T brake act slide ②. (Note: You can remove the S brake assembly ⑦ and the T brake assembly ⑤ without removing the T brake act slide ②.)
3) Remove the brake spring ③.
4) Remove the two clamps ④ simultaneously, then remove the T brake assembly ⑤.
5) Remove the clamp ⑥, then remove the S brake assembly ⑦.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧ and ⑨.
2. When fitting the T brake act slide ②, align the mark ⑩ with the shaft ⑪.

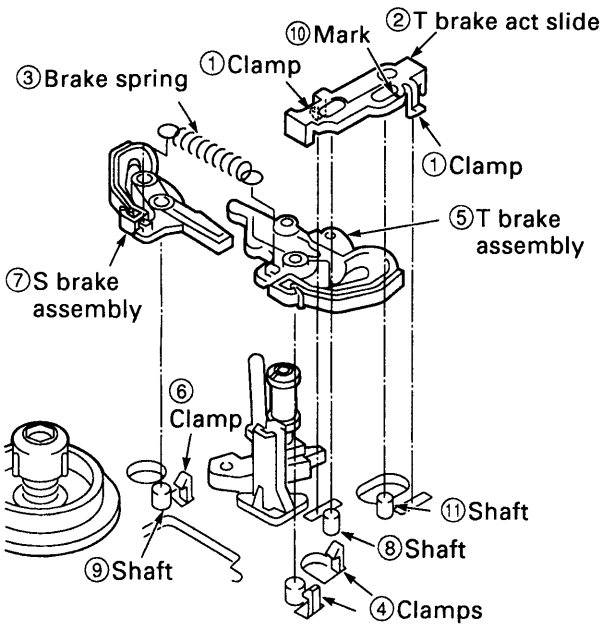


Fig.3-13-1

3-13-2. BRAKE CONTROL LEVER AND BRAKE ACT LEVER ASSEMBLY (See Fig.3-13-2)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-15 and remove the wheel gear 2.
3) Refer to sections 3-12-1, then remove the reel belt and the reel pulley.
4) Remove the clamp ①, then remove the wheel gear 1 ②.
5) Remove the clutch change spring ③.
6) Remove the clamps ④ and ⑤, then remove the brake control lever ⑥. Remove the clamp ④ on the topside of the mechanism chassis.
7) Remove the brake return spring ⑦.
8) Refer to section 3-8 and remove the worm gear assembly.
9) Remove the clamp ⑧ and clamp ⑤, then remove the brake act lever assembly ⑨. To maintain the performance of the brake act lever assembly ⑨, do not disassemble it.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑩ and ⑪, to the teeth of the wheel gear 1 ②, and to the pin ⑫ of the brake control lever ⑥.
2. Put the pin ⑬ of the brake control lever ⑥ into the cam groove ⑭ of the crescent slide.
3. Before fitting the wheel gear 1 ②, align the hole ⑮ with the hole ⑯ on the mechanism chassis.
4. Refer to section 3-15 and align the wheel gear 2.

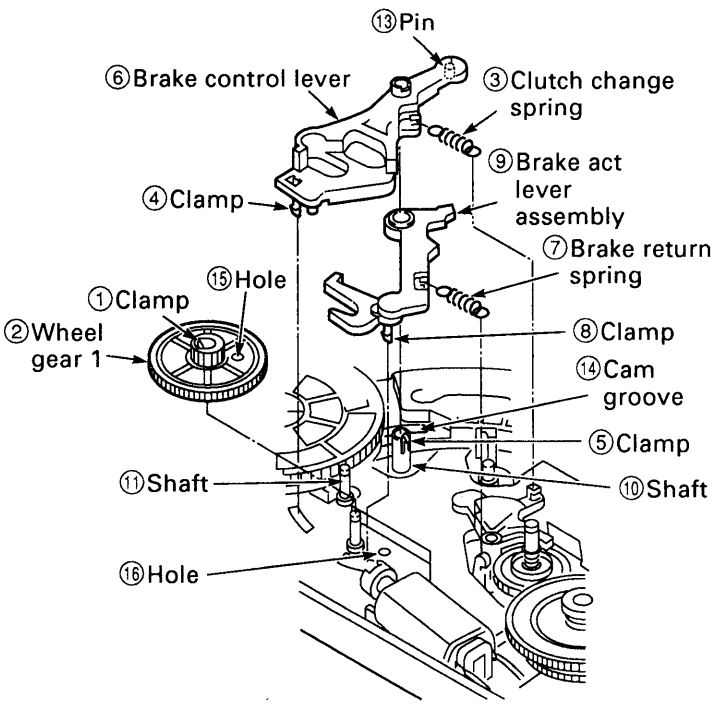


Fig.3-13-2

3-13-3. S BRAKE ACT SLIDE AND BT SPRING LEVER ASSEMBLY (See Figs.3-13-3 and 3-13-4)

1) Refer to section 3-16 and remove the crescent slide.
2) Refer to section 3-12-1 and remove the friction gear assembly.
3) Slide the S brake act slide ① in the direction of the arrow Ⓐ, then remove it.
4) Refer to section 3-11 and remove the BT spring.
5) Press the BT spring lever assembly ② until it touches the pin ③, then remove it.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shaft ④ shown in Fig. 3-13-3, and to the BT spring lever assembly ② and the S brake act slide ① shown in Fig.3-13-4.
2. After mounting the BT spring lever assembly ② on the Shaft ④, hook the BT spring onto the clamp ⑤ and press it until it touches the pin ⑥.
3. Make sure that the clamps ⑦, ⑧ and ⑨ have snapped into the S brake act slide ①. Align the arrow ⑩ on the S brake act slide ① with the arrow ⑪ on the mechanism chassis.

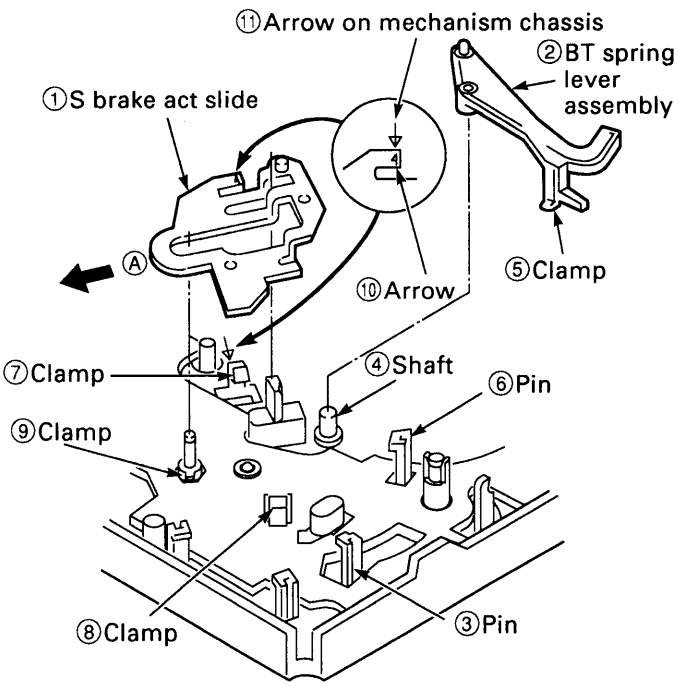


Fig.3-13-3

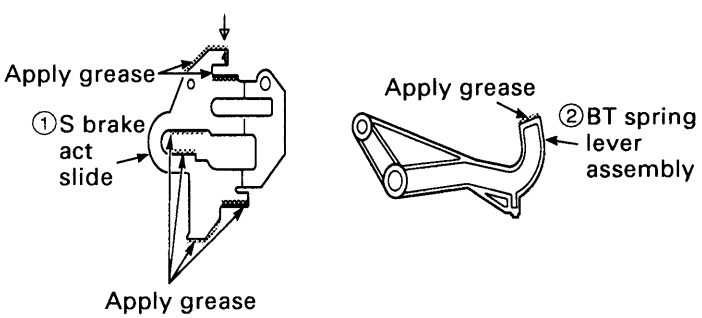


Fig.3-13-4

3-14. GUIDES

3-14-1. GUIDE ROLLER ASSEMBLY (See Fig.3-14-1)

1) Unscrew the two screws ①. When you do this, be careful not to damage the cylinder or the video head.
2) Remove the two guide roller assemblies ② by unscrewing them anticlockwise.

ASSEMBLY NOTES:

1. Tighten the two screws ① to a torque of 600 g/cm. After tightening, apply a screw-locking glue.
2. After replacing the parts, be sure to clean the guide roller and carry out tape path adjustment as described in section 4-3.

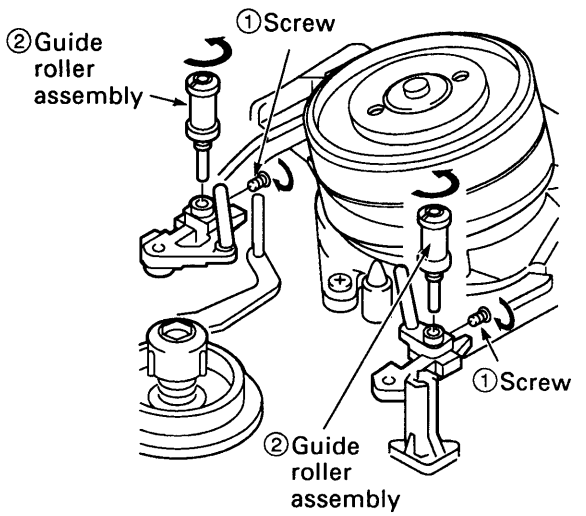


Fig.3-14-1

3-14-2. S AND T INCLINE MOUNTING ASSEMBLIES (See Fig.3-14-2)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-5-2 and remove the cylinder unit.
3) Refer to section 3-1 and rotate the loading motor in the PLAY direction until tape loading is completed.
4) Shift the S incline mounting assembly ① slightly, in the direction of the arrow Ⓐ, then remove it from the S load lever assembly ②.
5) Shift the T incline mounting assembly ③ slightly, in the direction of the arrow Ⓑ, then remove it from the T load lever assembly ④.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rail (top, underside and sides) on the mechanism chassis.
2. When fitting the S and T incline mounting assemblies ① and ③ into the rail, turn the loading motor manually in the EJECT direction. When tape unloading begins, watch out in case the S and T incline mounting assemblies ① and ③ get caught in the rail.
3. After replacing the parts, clean the cylinder and the roller guide, then adjust the tape path as described in section 4-3.

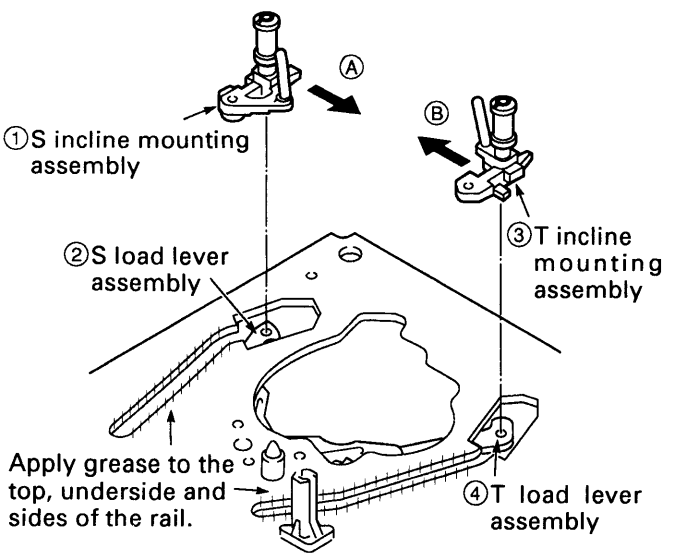

Ⓐ
Ⓑ
①S incline mounting assembly
②S load lever assembly
③T incline mounting assembly
Apply grease to the top, underside and sides of the rail.
④T load lever assembly

Fig.3-14-2

3-15. WHEEL GEAR 2, MAIN CAM AND MODE SWITCH (See Figs.3-15-1 and 3-15-2)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-7-1, then remove the harness mounting.
3) Remove the clamp ①, then remove the wheel gear 2 ②.
4) Remove the washer ③, then remove the main cam ④.
5) After unscrewing the screw ⑤, remove the soldering from the terminal of the mode switch ⑥.
6) Remove the clamp ⑦, then remove the mode switch ⑥.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧, ⑨ and ⑩, to the teeth of the main cam ④, and to the all over the cam groove of main cam ④.
2. When fitting the mode switch ⑥, align it in Ⓐ Ⓑ order as shown in Fig.3-15-2. The alignment of the part Ⓑ is shown in Fig. A. Position the teeth of the mode switch ⑥ so that the sixth tooth space left of part Ⓐ is aligned with the triangular mark on the pinch cam gear ⑪. After aligning part Ⓑ, refer to section 3-9-2 and check the positioning of the mode switch, the pinch cam gear and the pinch lift cam.
3. Beforehand, remove the soldering from the soldered part of the MC-1 PWB assembly, in order to prevent the mode switch ⑥ being warped. Solder the mode switch ⑥ after tightening the screw ⑤ (See Fig. 3-15-1).
4. Align the hole in the crescent slide ⑫ with the hole in the mechanism chassis, as shown at point Ⓖ in Fig.3-15-2 (refer to section 3-16 and see the holes ⑤ and ⑥ in Fig.3-16-1).
5. When fitting the main cam ④, position the mode switch ⑥ and the front rack gear ⑬ as shown at points Ⓒ and Ⓓ respectively in Fig.3-15-2.
6. When fitting the gear wheel 2 ②, position the main cam ④ and the wheel gear 1 ⑭ as shown at points Ⓔ and Ⓕ respectively in Fig.3-15-2.

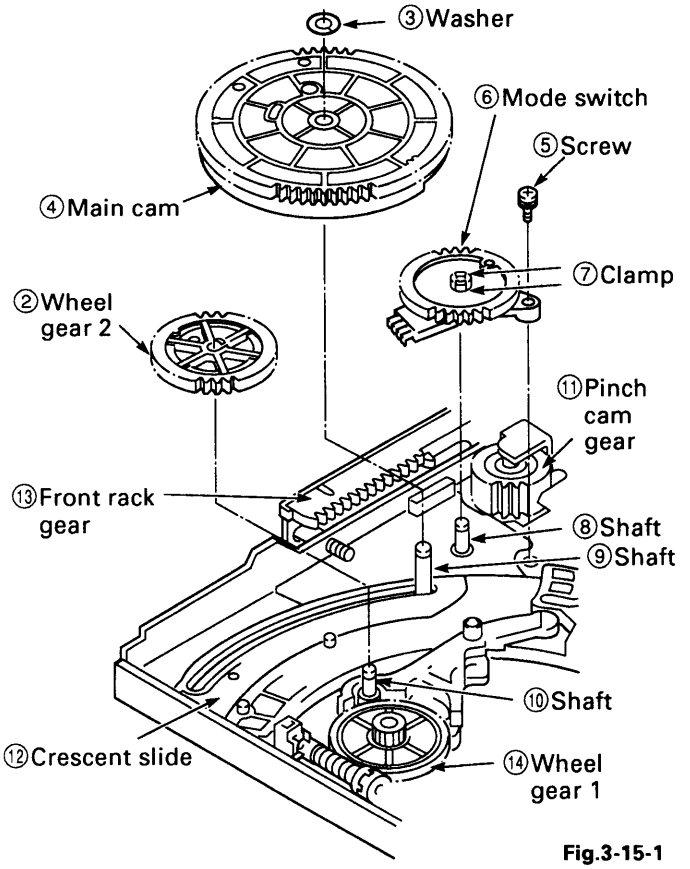


Fig.3-15-1

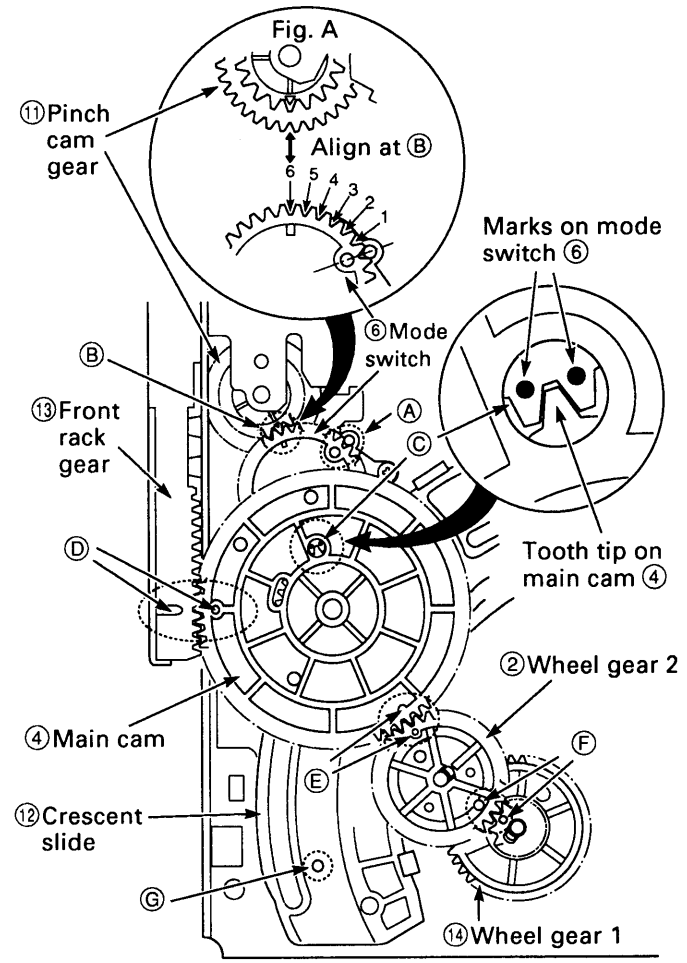


Fig.3-15-2

3-16. CRESCENT SLIDE (See Figs.3-16-1 and 3-16-2)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Refer to section 3-7-2 and remove the capstan brake assembly.
4) Refer to section 3-12-4 and remove the T soft brake assembly.
5) Refer to section 3-13-1 and remove the T brake act slide.
6) Refer to section 3-12-1, then remove the reel belt and the reel pulley.
7) Refer to section 3-15, then remove the wheel gear 2 and the main cam.
8) Refer to section 3-13-2, then remove the wheel gear 1 and the brake control lever.
9) Remove the two screws ⑪, then remove the crescent mounting ⑫.
10) Remove the clamps ① and ②, then raise the right end of the crescent slide ③ slightly. Slide the crescent slide ③ to the right until it comes away from the clamp ④, then remove it.

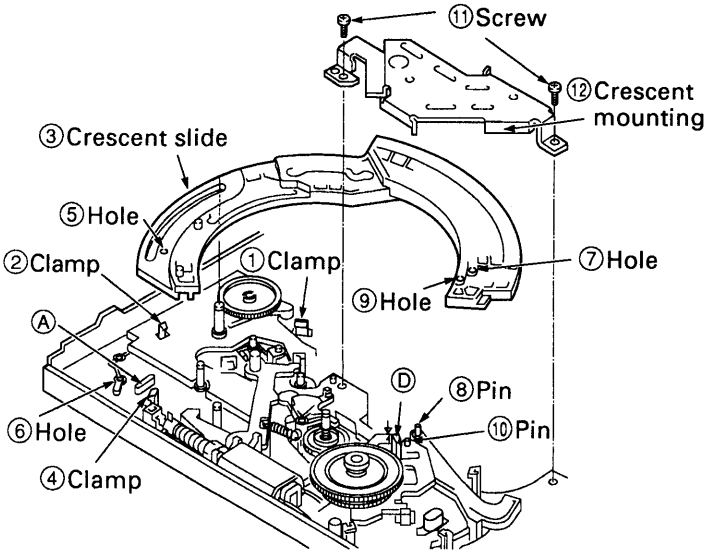


Fig.3-16-1

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the points Ⓐ,Ⓑ,Ⓒ and Ⓓ in Fig.3-16-1, and to the crescent slide ③ shown in Fig.3-16-2.
2. Before fitting the crescent slide ③, refer to section 3-13-3 and align the arrow on the S brake act slide with the arrow on the mechanism chassis. Then refer to Fig.3-17-3 and check that the S load gear and the T load gear have completed tape unloading.
3. When assembling the parts, raise the right side of the crescent slide ③ slightly, and keeping it in this position, slot the left side into the clamp④, then align the hole⑤ with the hole⑥ in the mechanism chassis. When you do this, check that the hole⑦ is aligned with the pin⑧ on the BT spring lever assembly, and that the hole⑨ is aligned with the pin ⑩ on the S brake act slide, before pressing the crescent slide③ into place. Check that the clamps ①, ② and ④ are engaged.
4. After assembly, check that each lever and each brake is working properly.

Apply grease to the areas shown in ▭
• The places marked by dots should be greased particularly generously.

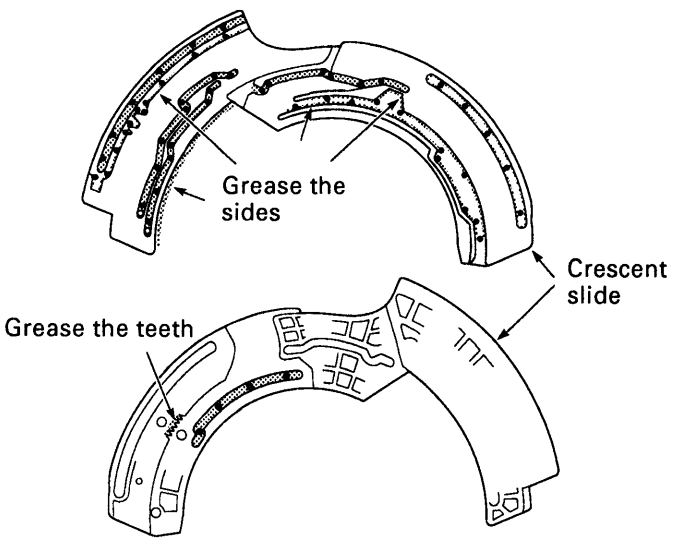


Fig.3-16-2

3-17. S LOAD GEAR, T LOAD GEAR, S LOAD LEVER ASSEMBLY AND T LOAD LEVER ASSEMBLY (See Figs.3-17-1, 3-17-2 and 3-17-3)

1) Refer to section 3-16 and remove the crescent slide.
2) Refer to section 3-14-2 and remove the S and T incline mounting assemblies.
3) Remove the clamp ①, then remove the components: the S load gear ②, the S load spring ③ and the S load lever assembly ④. When you do this, be careful not to damage the clamp ①, which can be damaged easily. Again, be careful when you disassemble the components, as the S load spring ③ will spring out.
4) Remove the following components: the T load gear ⑤, the T load spring ⑥, and the T load lever assembly ⑦. Be careful when you disassemble the components, as the T load spring ⑥ will spring out.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧, ⑨ and parts A shown in Fig.3-17-1. Then apply grease (VHJ-0100) to the parts shown in Fig.3-17-2.
2. When fitting the S load gear ② and the T load gear ⑤ align them in the tape-loaded state, as shown in Fig. A in Fig.3-17-3. Again, after completing tape-unloading on these gears, check that they are positioned as shown in Fig. B in Fig.3-17-3, then refer to section 3-14-2 and fit the S and T incline mounting assemblies.

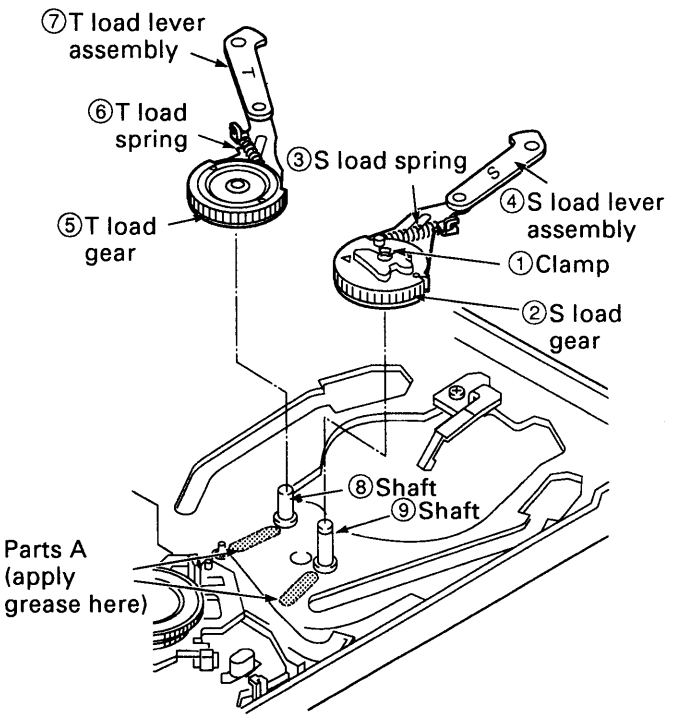
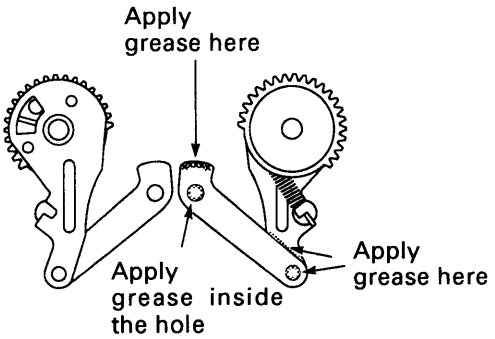


Fig.3-17-1

(T side)



(S side)

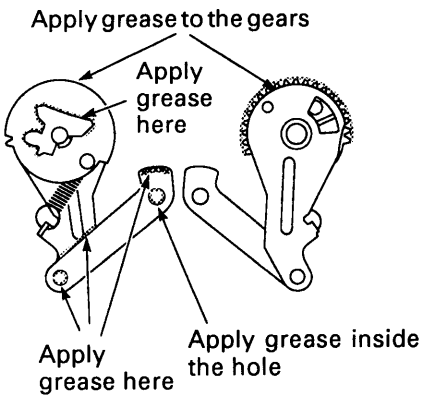


Fig.3-17-2

Fig. A: When tape loading is complete

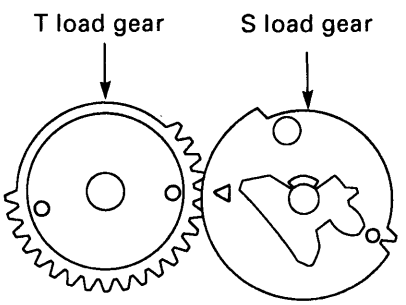


Fig. B: When tape unloading is complete

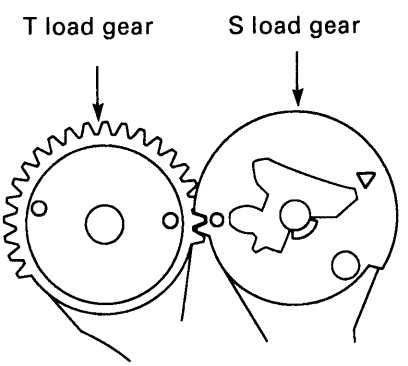


Fig.3-17-3

3-18. TAPE SENSORS, REEL SENSOR AND EP SW LEVER

3-18-1 TAPE TOP SENSOR AND TAPE END SENSOR (See Fig.3-18-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Remove the soldering from the MC-1 PWB assembly, then remove the photo diodes ①, ② and the LED ③. When removing the photo diode ② on the tape top sensor side, refer to section 3-15 and remove the main cam.

ASSEMBLY NOTES:

1. Fit the photo diodes ① and ② so that their photo-receptors to face the LED ③, as shown in Fig.3-18-1. Align the cuts in the LED ③ and the holder ④. Push the photo diodes ①, ② and the LED ③ as far down as they will go, so that they do not protrude above the top of their holders.
2. Do the soldering quickly.

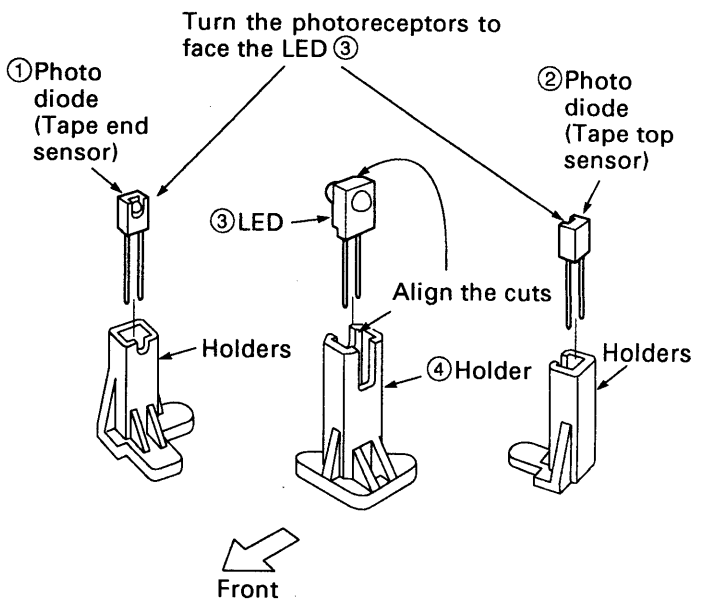


Fig.3-18-1

3-18-2. REEL SENSOR (See Fig.3-18-2)

1) Refer to sections 3-12-2 and 3-12-4, then remove the clutch mounting assembly, the T soft brake assembly and the take up reel assembly.
2) Refer to section 3-13-2, then remove the wheel gear 2, the wheel gear 1, and the brake control lever.
3) Remove the soldering from the MC-1 PWB assembly, then remove the photo diode (reel sensor) ①.

ASSEMBLY NOTES:

1. When assembling the parts, align the cut on the photo diode (reel sensor) ① with the protrusion on the mechanism chassis ②.
2. Do the soldering quickly.

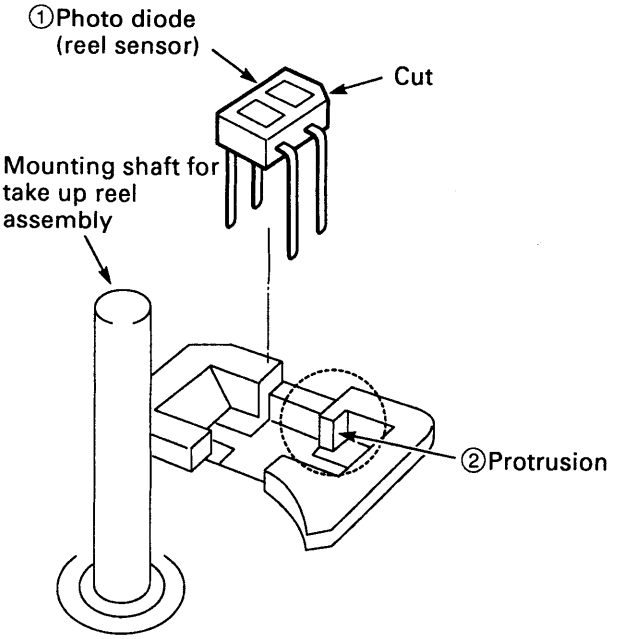


Fig.3-18-2

3-18-3. EP SWITCH LEVER (See Fig.3-18-3)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove the EP switch spring ①.
3) Remove the clamp ②, then remove the EP switch lever ③.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the protrusion ④ on the back of the EP switch lever ③.
2. After fitting the cassette mechanism assembly, check that in EJECT mode, the EP switch lever ③ does not touch the EP switch ⑤.

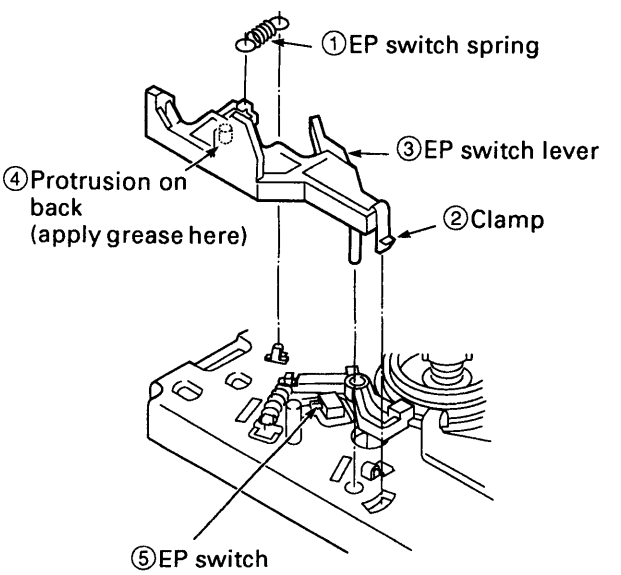


Fig.3-18-3

4. MECHANISM CHECKS AND ADJUSTMENTS

4-1. REEL TABLE TORQUE CHECK

1)With the power switch turned OFF, stick black vinyl tape over the photo diodes of the tape sensors. Then turn the power switch ON. Front loading will begin. Refer to section 3-2 and Fig.3-2-2, and release the locks of the tray lock lever and the lid opener lever.

NOTES:

1. The measurements must be taken without any incandescent light or daylight.

2. If the mechanism cannot be put into PLAY, FF or REW mode by the method described in 1) above, make a dummy cassette tape, as shown in Fig.4-1-2. The dummy cassette tape is made as follows: Unscrew the five screws on the underside, remove the reels, leaf springs and other parts on the supply and take up sides, make holes in the upper surface as wide as the reel diameter, then assemble the parts.

2) Put the mechanism into REW mode, wait at least 10 seconds, then measure the torque value of the reel table on the supply side. It should be at least 600 g/cm. Take the measurement with the torque dial gauge (VHJ-0004) held in position in your hand (lock torque). While taking the measurement, rotate the reel table (take up reel assembly) on the take up side with your hand so that the reel sensor does not respond.

3) After switching to FF mode, wait for at least 10 seconds and then measure the torque value of the reel table on the take up side. It should be at least 600g/cm (lock torque).

4) After switching to PLAY mode, wait for at least 10 seconds and then measure the torque value of the reel table on the take up side. It should be between 80 and 140g/cm (lock torque).

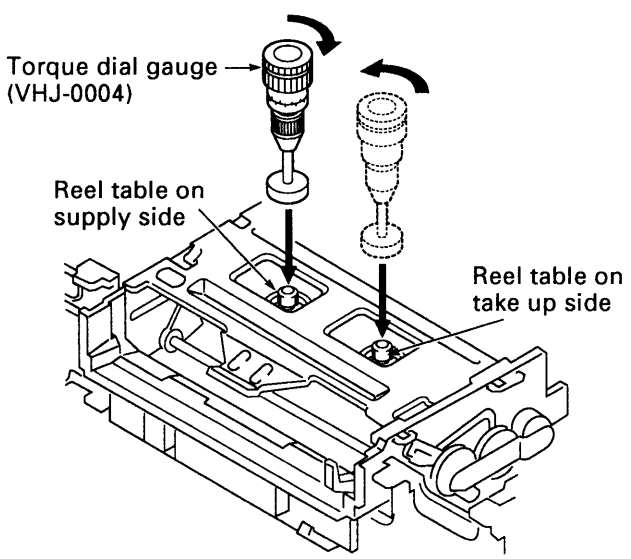


Fig.4-1-1

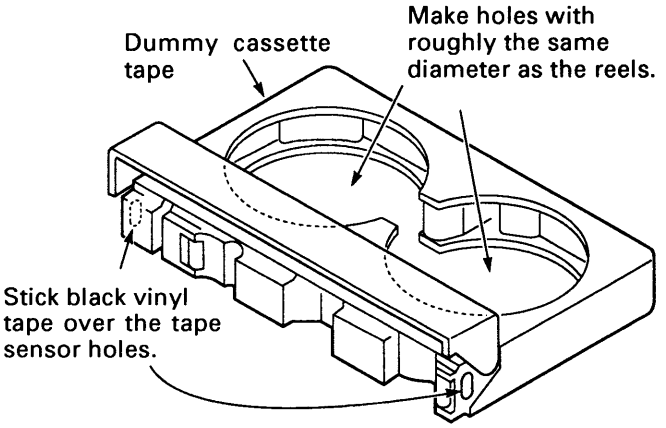


Fig.4-1-2

4-2. ADJUSTING THE BT LEVER ASSEMBLY POSITION AND CHECKING THE BACK TENSION TORQUE IN PLAY MODE

4-2-1. BT LEVER POLE POSITION ADJUSTMENT (See Fig.4-2-1)

1) Without loading a cassette tape, put the mechanism into PLAY mode (turn the power switch OFF).

2) Adjust point Ⓐ on the band brake assembly by rotating it so that the tip of the BT lever assembly is aligned with the line on the left side of the mechanism chassis.

3) Refer to section 4-2-2 and check that the back tension torque is between 30 and 50g/cm.

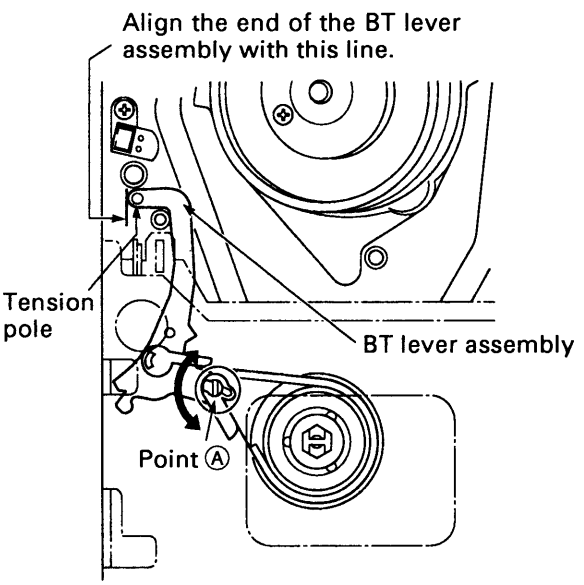


Fig.4-2-1

4-2-2. CHECKING THE BACK TENSION TORQUE PLAY MODE

1) Mount the cassette torque meter (VHJ-0016) and switch to PLAY mode.

2) Check that the back tension torque is between 30 and 50g/cm.

4-3. TAPE PATH ADJUSTMENT

In normal circumstances, the tape path system does not need to be adjusted. However, after removing or replacing one of the parts shown in Fig.4-3-1, you should check and adjust the tape path. The adjustment of the tape path is carried out while monitoring the envelope waveform of the video head output, using an oscilloscope. To make sure that the tape drawn off the reel runs freely and without excessive tension along all the tape guides and cylinders (drums), it is also important to check each tape guide by eye.

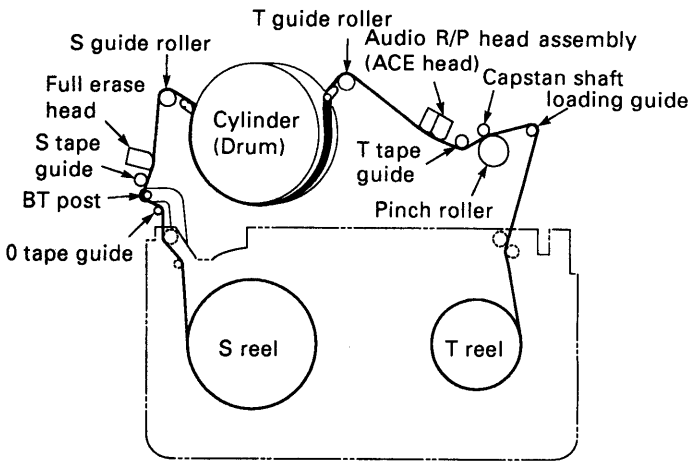


Fig.4-3-1

4-3-1. ADJUSTMENT PROCEDURE

1. Select a PAL or NTSC alignment tape or blank cassette tape, according to the transmission system of the VCR you are repairing.

NTSC: For models with 525 scanning lines and a field frequency of 60Hz

PAL: For models with 625 scanning lnes and a field frequency of 50Hz

2. Clean the tape guides, the cylinder (drum), the capstan Shaft, the audio R/P head (ACE head) and the full erase head.
3. Using an oscilloscope, adjust the height of the guide roller and carry out horizontal position adjustment,height adjustment and azimuth adjustment on the audio R/P head (ACE head). When observing the envelope waveform, bring the CH-1 probe into contact with the envelope waveform test point, and bring the CH-2 probe into contact with the switching pulse (SW P) test point. While adjusting the tape path, set the trigger at the low side of the switching pulse (SW P) in order to observe the output waveform on the CH-1 side of the video head.

NOTE:The contact point for the oscilloscope varies from one model to another, so to find the correct point for your model, refer to the figure entitled "Test point for tape path adjustment" in the electrical circuit section of the service manual.

4. When checking the tape path by eye, use a dental mirror.

4-3-2. LOAD LEVER ASSEMBLY HEIGHT ADJUSTMENT (See Fig.4-3-2)

1. Refer to sections 3-9-2, and remove the opener mounting .
2. Position the height adjustment tool (VHJ-0102)③ under the full surface of the protrusion ② on the load lever assembly ①, as shown in Fig.4-3-2.
3. Using your fingers, gently screw the adjustment nut ④ clockwise into the nut box (VHJ-0048) ⑤ until the protrusion ② of the load lever assembly① touches the height adjustment tool (VHJ-0102)③ and the screw starts to feel tight. Next, loosen the adjustment nut ④ by 270° anticlockwise.
4. Load a cassette tape (NTSC: T-160, PAL: E-240) and switch to PLAY mode. Check that when you do this, no scratches appear on the upper or lower edges of the tape. If scratches do appear, re-adjust the height.

Arrange the equipment so that the whole surface of the projection on the load lever assembly is positioned over the height adjustment tool (VHJ-0102) when seen from directly overhead.

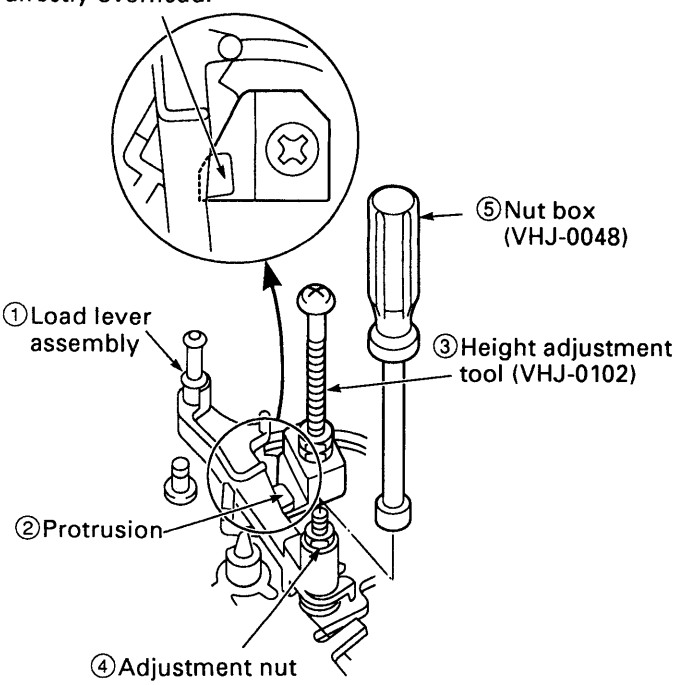


Fig.4-3-2

4-3-3. GUIDE ROLLER HEIGHT ADJUSTMENT (See Figs.4-3-3 and 4-3-4)

1) Play the Alignment Tape (NTSC: VHJ-0006, PAL: VHJ-0009) and check that the envelope waveform is at its maximum at the tracking centre. Then, after loosening the S guide roller and the T guide roller by rotating them anticlockwise, tighten them in turn until the envelope waveform becomes flat. If the envelope waveform is not at its maximum at the tracking centre, refer to section 4-3-4 and carry out a rough adjustment of the horizontal position of the audio R/P head (ACE head) before adjusting the guide rollers.
2) Adjust the S guide roller.
   ① Press the tracking button (Channel –), and check whether, when the envelope waveform has reached 50% of its maximum, the front half of the envelope waveform is flat. If not, fine-tune the S guide roller as follows.
   a. If the front half of the envelope waveform is as shown in Fig.4-3-4 (a), this means that you have pressed the S guide roller too far. Therefore, loosen it slightly, and when it is in the state shown in Fig.4-3-4 (b), tighten it again, stopping when the envelope waveform is flat.
   b. If the front half of the envelope waveform is as shown in Fig.4-3-4 (b), this means you have not pressed the S guide roller far enough. Therefore, tighten it slightly, stopping when the envelope waveform becomes flat.
   c. If the front half of the envelope waveform is as shown in Fig.4-3-4 (c), it may happen that when you tighten the S guide roller, the wrapper waveform does not disappear, but sinks into the flat part, as shown in Fig.4-3-4 (d). If this happens, the status shown in Fig.4-3-4 (c) is normal, so loosen the S guide roller, then tighten it again until the envelope waveform is as shown in Fig.4-3-4 (c).
   ② Check that at the tracking centre, the output of the front half of the envelope waveform is not less than 80% of the maximum.
   ③ Rotate the S guide roller 20° anticlockwise.
3) Adjust the T guide roller.
   ① Press the tracking button (channel –) and check whether, when the envelope waveform is 50% of maximum, the back half of the envelope waveform is flat. If not, loosen the T guide roller slightly, then tighten it gradually until the back half of the envelope waveform becomes flat.
   ② Check that the output for the back half of the envelope waveform is at its maximum at the tracking centre.
4) Check that the envelope waveform does not fluctuate when you switch from F-SEARCH to PLAY or from R-SEARCH to PLAY. If it does fluctuate, repeat steps 3) and 4).

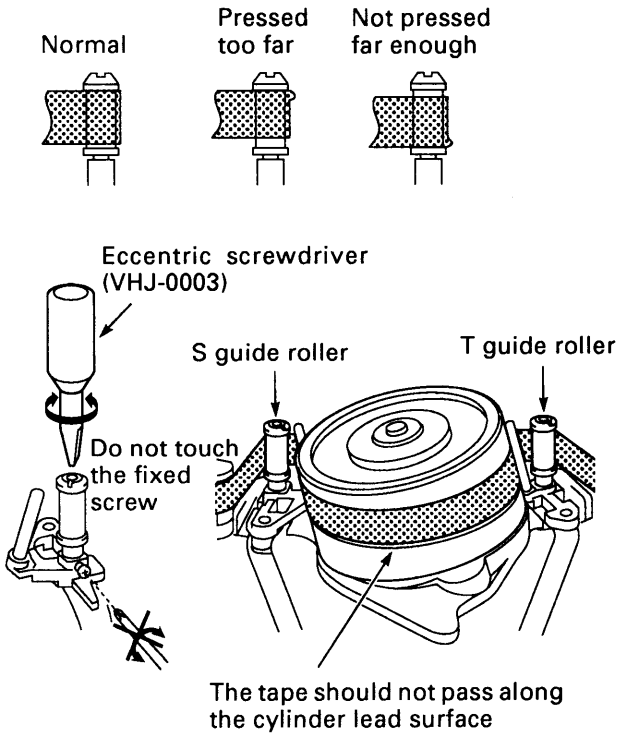

Normal
Pressed too far
Not pressed far enough
Eccentric screwdriver (VHJ-0003)
S guide roller
T guide roller
Do not touch the fixed screw
The tape should not pass along the cylinder lead surface

Fig.4-3-3

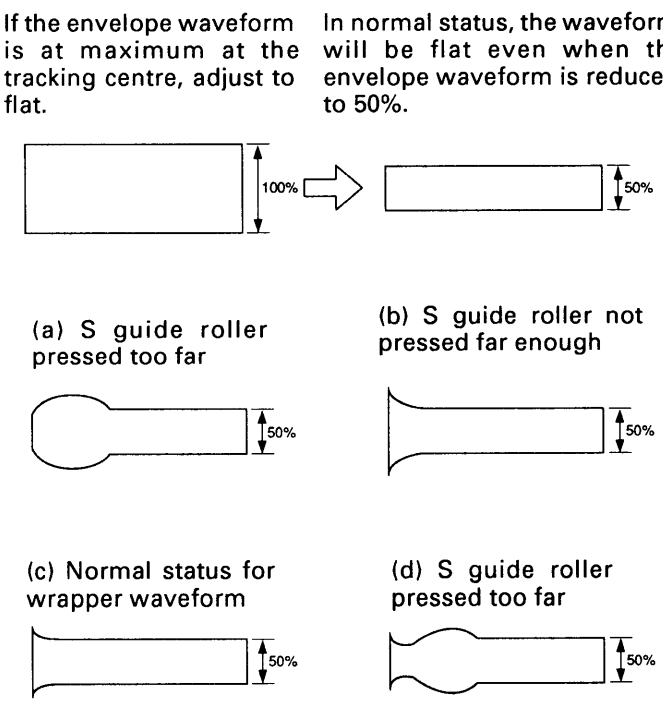

If the envelope waveform is at maximum at the tracking centre, adjust to flat.
In normal status, the waveform will be flat even when the envelope waveform is reduced to 50%.
100%
50%
(a) S guide roller pressed too far
(b) S guide roller not pressed far enough
50%
50%
(c) Normal status for wrapper waveform
(d) S guide roller pressed too far
50%
50%

Fig.4-3-4

4-3-4. AUDIO R/P HEAD (ACE HEAD) HEIGHT ADJUSTMENT, AZIMUTH ADJUSTMENT AND HORIZONTAL POSITION ADJUSTMENT

(1) Azimuth adjustment (See Fig.4-3-5)

1) Play the alignment tape (NTSC: VHJ-0005, PAL: VHJ-0008) and observe the waveform of the audio output, using an oscilloscope.
2) Loosen the height adjustment screw in the counter-clockwise direction and decrease the amplitude of the audio output waveform. In this state, tighten the screw in the clockwise direcion and maximize the amplitude. Slightly tighten the screw further in the clockwise direction and decrease the amplitude, and then loosen it slowly in the counterclockwise direcion until the amplitude starts to reach the maximum.
3) Set the amplitude of the audio output waveform to maximum by rotating the azimuth adjustment screw.
4) Make sure that the tape edge is running between the top of the audio head and the bottom of the control head.
   Gaps A and B should be roughly equal.

NOTE:Rotate the adjustment screw with a slotted screwdriver. Do not apply excessive force vertically. As the height adjustment screw also adjusts tilt, rotate it slowly. Do not rotate it excessively. And apart from the this screw, and height adjustmment screw, the screws is precisely adjusted before shipment from the factory, and should not be tampered with. Tampering with these screws can lead to scratching of the tape and other problems.

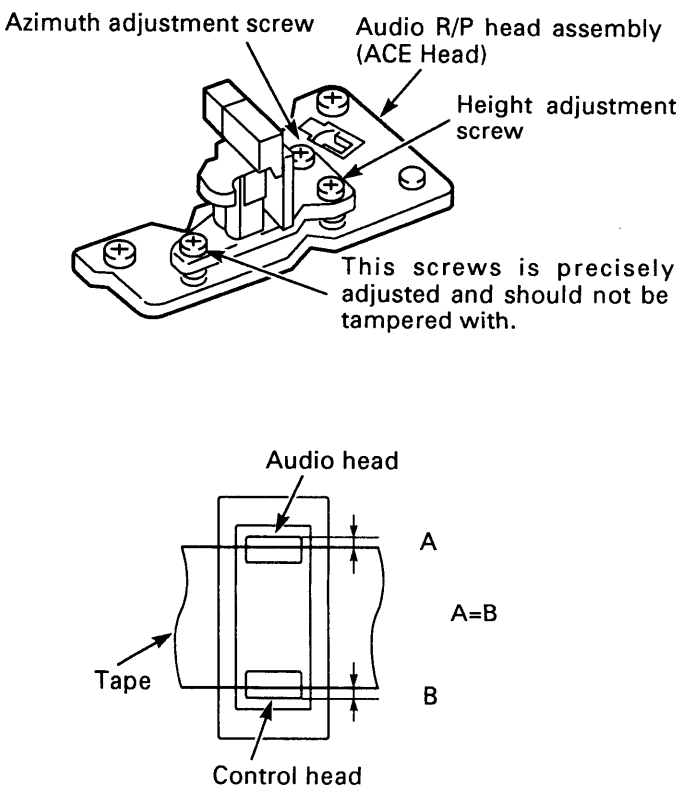


Fig.4-3-5

(2) Horizontal position adjustment (See Fig.4-3-6)

1) Play the alignment tape (NTSC: VHJ-0006, PAL: VHJ-0009).
2) Press the tracking buttons (channel + and channel –) simultaneously and set the tracking to the centre.
3) Using an oscilloscope, observe the waveform of the video head output.
4) Loosen the two fixed screws on the audio R/P head (ACE head) by between 20° and 30° anticlockwise.
5) Using a slotted screwdriver, adjust the position of the audio R/P head (ACE head). At the position where the amplitude of the envelope waveform is at its maximum at the tracking centre, tighten the fixed screw on the audio R/P head (ACE head). When you do this, check that the envelope waveform changes equally whether the tracking is shifted by pressing the tracking button in the plus or the minus direction.
6) Play the alignment tape (NTSC: VHJ-0007 PAL: VHJ-0052) and check that the amplitude of the envelope waveform is at its maximum at the tracking centre. If not, repeat steps 1) to 6).
7) Refer to the electrical adjustments section of the service manual, and adjust the switching position of the servo circuit.

NOTE:

1. When you press the tracking buttons (channel + and channel –) simultaneously, the tracking is reset to the tracking centre. When the tracking is at the tracking centre, the message "T - : - " will appear in place of the clock display on the front panel. If you keep pressing the channel – button the messages "T -: " and "T - -: " will appear, while if you keep pressing the channel + button, the messages "T : -" and "T : - - " will appear. Three seconds after you stop pressing the tracking buttons, the clock display will re-appear.
2. The check described in paragraph 6) is not necessary for models in which the only tape speed is SP mode.

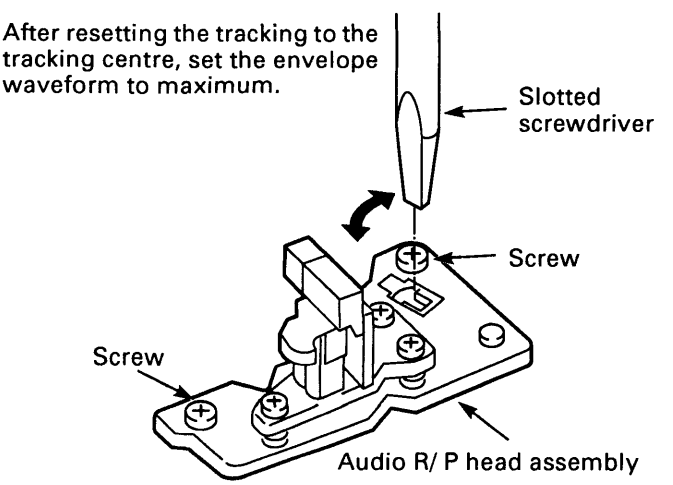

After resetting the tracking to the tracking centre, set the envelope waveform to maximum.
Slotted screwdriver
Screw
Screw
Audio R/ P head assembly

Fig.4-3-6

4-3-5. CHECKING AFTER ADJUSTMENT

1) Play the alignment tape (NTSC: VHJ-0006, PAL: VHJ-00 09) and check that the envelope waveform is activated immediately and that there are no fluctuations in the envelope waveform or the audio output waveform.
2) Load a cassette tape (NTSC: T-120, PAL: E-180) and use it to record and replay. Check that the envelope waveform is activated immediately and that there are no fluctuations in the envelope waveform or the audio output waveform. (When recording on the tape, input 1kHz to the audio input terminal. Use a scratch-free cassette tape (NTSC: T-120, PAL: E-180).) Check that at the tracking centre, the front half down and back half down are not more than 20% of the value at the point where the envelope waveform amplitude is at its maximum.
3) Check that the envelope waveform is activated immediately when you switch from PLAY to R-SEARCH or from R-SEARCH to PLAY. Check that there is no slack in the tape next to the pinch roller.
4) Check that the envelope waveform is activated immediately when you switch to PLAY from FF, REW, F-SEARCH, R-SEARCH or STOP mode. Check that there is no slack in the tape next to the pinch roller.
5) Check that the tape is not curling or riding up on the upper or lower flanges of the tape guides in PLAY, FF, REW, F-SEARCH or R-SEARCH modes.
6) Check that in PLAY mode, the tape runs as shown in Fig.4-3-7.
7) Load a tape (NTSC: T-160, PAL: E-240) and play it back. carry out the checks described in steps 3) to 5) above.

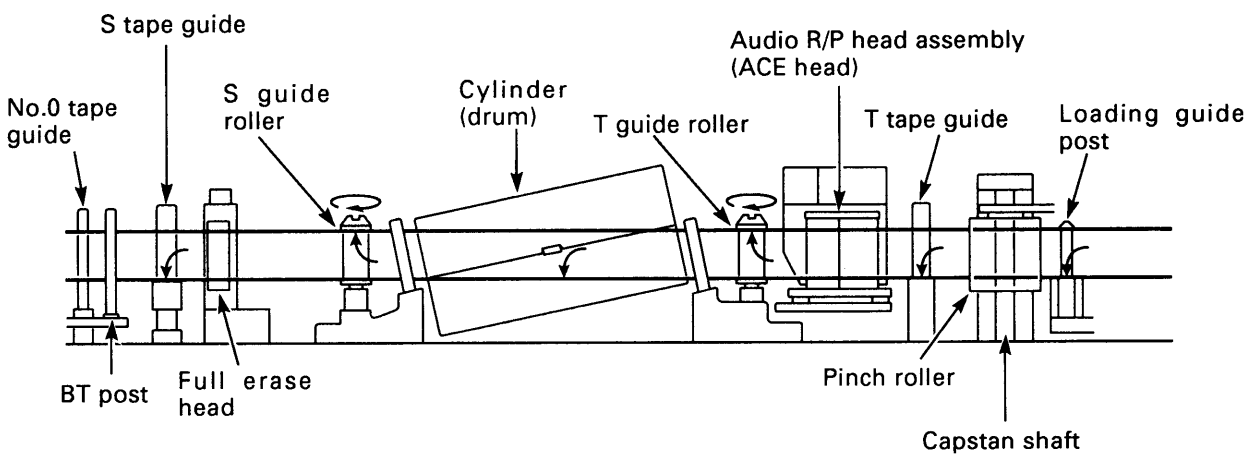


Fig.4-3-7

FILE NO.

SUPPLEMENT SERVICE TECHNICAL INFORMATION

SANYO

FISHER

Video Cassette Recorder

V95 II MECHANISM

Use this supplement together with the V95 I mechanism manual (Reference No. MM531433) of the Service Technical Information published in 1995.

Please see other materials with Reference No. given in table below.

Materials	Model No.	Reference No.
Basic Service Technical Information	V95 I Mechanism	MM531433

VHS
PAL SECAM NTSC

Contents

Outline 2
3-5-3. CYLINDER MOTOR (ROTOR AND STATOR) 2
3-5-4. CYLINDER ASSEMBLY 3
3-14-2. S AND T INCLINE MOUNTING ASSEMBLIES 3

Outline

The V95 II mechanism has the same basic structure as the V95 I mechanism, but the part for mounting its cylinder assembly has been changed.

The cylinder assembly of the V95 I mechanism requires a die casting cylinder mounting to be mounted. In the V95 II mechanism, the cylinder assembly can mounted directly to the mechanism chassis due to changes made in the chassis form.

As the V95 II mechanism does not require a cylinder mounting, its cylinder assembly and S • T incline mounting assemblies are replaced differently from the V95I mechanism.
This manual describes only the methods for replacing the cylinder assembly and S • T incline mounting assemblies. For other information, refer to the Service Technical Information (Reference No. MM531433).

[Page 13]

3-5-3. CYLINDER MOTOR (ROTOR AND STATOR) (See Fig.3-5-6)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the screw ① and remove the cylinder earth assembly ②.
3) Remove the two screws ③, the rotor ④ and the spacer ⑧.
4) Remove the three screws ⑤ and the stator ⑥.

ASSEMBLY NOTES:

1. When fitting the rotor ④, align the long hole ⑨ -beside the triangular mark on the rotor ④ - with the hole ⑩ in the rotor disk.
2. When fitting the screws ③ and ⑤, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 3 kg/cm.
3. Align the dowels ⑪ on the cylinder earth assembly ② with the holes ⑫ in the chassis.
4. After fitting the mechanism unit, do the switching position adjustment of the servo circuit.

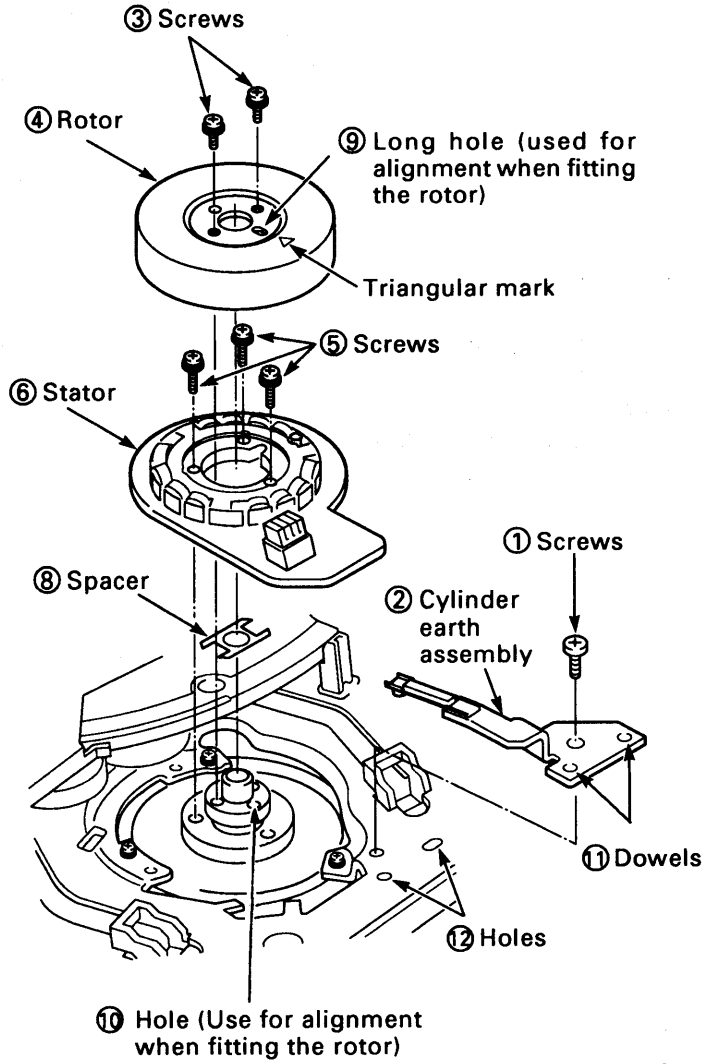


Fig.3-5-6

[Page 14]

3-5-4. CYLINDER ASSEMBLY (See Fig.3-5-7)

1) Refer to sections 3-5-3, and remove the cylinder unit, the rotor, and the stator.
2) Remove the three screws ① and the cylinder assembly ②.

ASSEMBLY NOTES:

1. Be careful not to scratch or soil the top of the cylinder. After fitting the cylinder, clean the surface.
2. Align the cylinder assembly ② with the two dowels ④ on the mechanism chassis ③.
3. After fitting the cylinder assembly, do the tape path adjustment as instructed in section 4-3 and do the switching position adjustment of the servo circuit.

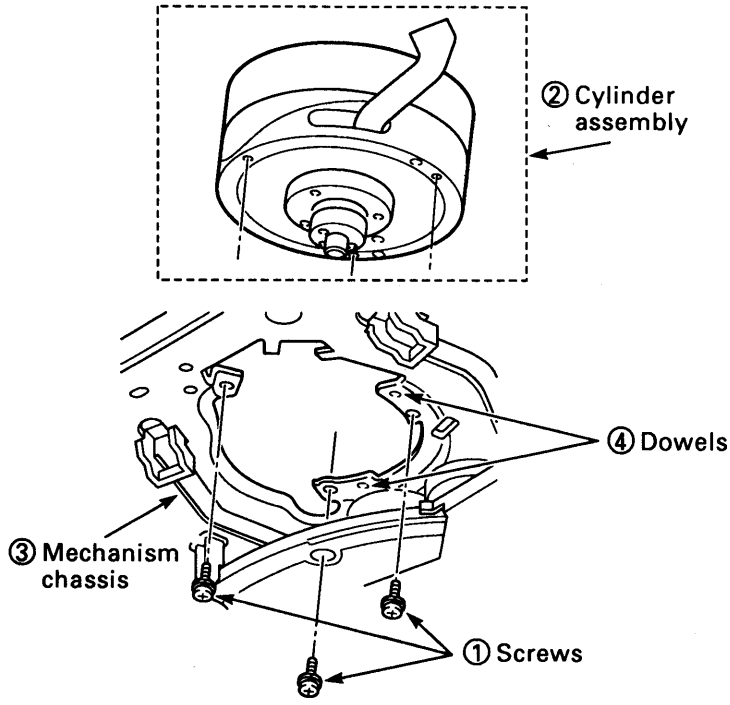


Fig.3-5-7

[Page 22]

3-14-2. S AND T INCLINE MOUNTING ASSEMBLIES (See Fig.3-14-2)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-4 and remove the cleaner lever.
3) Remove the four screws ⑤ and take off the two catcher mountings ⑥.
4) Refer to section 3-1 and rotate the loading motor in the PLAY direction until tape loading is completed.
5) Shift the S incline mounting assembly ① slightly, in the direction of the arrow Ⓐ, then remove it from the S load lever assembly ②.
6) Shift the T incline mounting assembly ③ slightly, in the direction of the arrow Ⓑ, then remove it from the T load lever assembly ④.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rail (top, underside and sides) on the mechanism chassis.
2. When fitting the S and T incline mounting assemblies ① and ③ into the rail, turn the loading motor manually in the EJECT direction. When tape unloading begins, watch out in case the S and T incline mounting assemblies ① and ③ get caught in the rail.
3. Aline the dowels on the catcher mounting ⑥ with the holes ⑦ in the mechanism chassis.
4. After replacing the parts, clean the cylinder and the roller guide, then adjust the tape path as described in section 4-3.

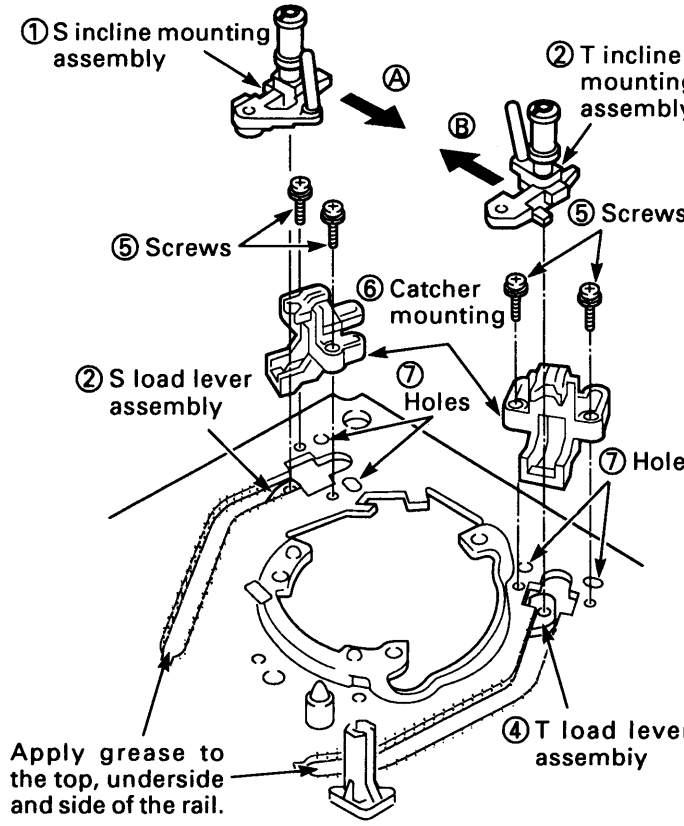


Fig.3-14-2

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